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DELFIC: DEPARTMENT OF DEFENSE FALLOUT PREDICTION SYSTEM

Volume II - User's Manual

Atmospheric Science Associates P.O. Box 307 Bedford, Massachusetts 01730

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PREFACE

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INTRODUCTION AND OVERVIEW

DELFIC (Defense Land Fallout Interpretative Code) is intended for research in local nuclear fallout prediction and to serve as a standard against which predictions by less capable, production-oriented codes can be judged. By local fallout we mean the intensely radioactive material which falls to the ground within several to several hundred miles of ground zero, depending on the size of the explosion. The code is essentially open-ended with regard to input data, it is highly flexible in that it offers many options that would not be available in a production-oriented code, and it strives to include as much of the physics of fallout transport and activity calculation, without resorting to short cuts, as is practicable.

Calculation begins at about the time the fireball reaches pressure equilibrium with the atmosphere. Rise, growth and stabilization of the nuclear cloud is computed by a dynamic model that treats the cloud as an entraining bubble of hot air loaded with water and contaminated ground material. The fallout particle cloud, including the stem, is formed during the cloud rise. This calculation requires specification of a vertical profile of atmospheric data: pressure, temperature, humidity and wind; thus the height, dimensions and vertically sheared horizontal displacement of a particular cloud are determined by the atmospheric stability and winds.

After cloud stabilization, representative parcels of fallout are transported through an atmosphere that is defined by input data. The user may specify a single vertical wind profile and assume a steady state. He may specify any number of wind profile updates. He may resolve the transport space in the horizontal and specify multiple wind profiles defined at different geographical locations, in which case winds in the cells of a three-dimensional space grid are determined by an interpolation procedure.

During transport, fallout parcels are expanded in the horizontal by ambient turbulence. Turbulence data may be input along with the winds, but since these data are rarely available, they can be calculated by the code.

To account for effects of vertical wind shear on the dispersion of individual parcels, tops and bases of the parcels are transported to ground impaction separately, and then recombined. The impacted parcels are distributed over the ground via a bivariate Gaussian function.

Any or all of sixteen unique quantities computed from the deposited fallout may be mapped. Radioactivity is calculated rigorously for any time by summing exposure or exposure rate contributions from all nuclides in the mixture of fission products. Any of twelve different types of fission may be specified. Induced activity in soil material in the fallout and in 238 U may be accounted for.

Physical and mathematical bases for DELFIC are given in Volume I of this set.

CODE DESCRIPTION

2.1 STRUCTURE

DELFIC is a FORTRAN code in three major parts or modules:

- Initialization and Cloud Rise Module (ICRM)
- 2. Diffusive Transport Module (DTM)
- 3. Output Processor Module (OPM), plus the Particle Activity Sub-modules which are controlled by the OPM.

The ICRM accepts basic data and carries the prediction calculation through rise and stabilization of the nuclear cloud. The DTM transports fallout parcels from the stabilized cloud to ground impaction, and the OPM processes the deposited parcels into fallout maps.

Communication between modules is via external storage units (Table 1) so that the modules can and should be overlayed. COMMON NUMTAP(15), which appears in each overlay executive program, contains external storage unit numbers. Figure 1 displays the code organization including the overlay structure.

Table 2 provides an alphabetical listing of all DELFIC programs with a description of the function of each. FORTRAN codes are listed in sec. 5. The executive code (ICRMEX, DTMEX, OPMEX) of each module contains extensive glossaries of mnemonics.

2.2 COMPUTER REQUIREMENTS

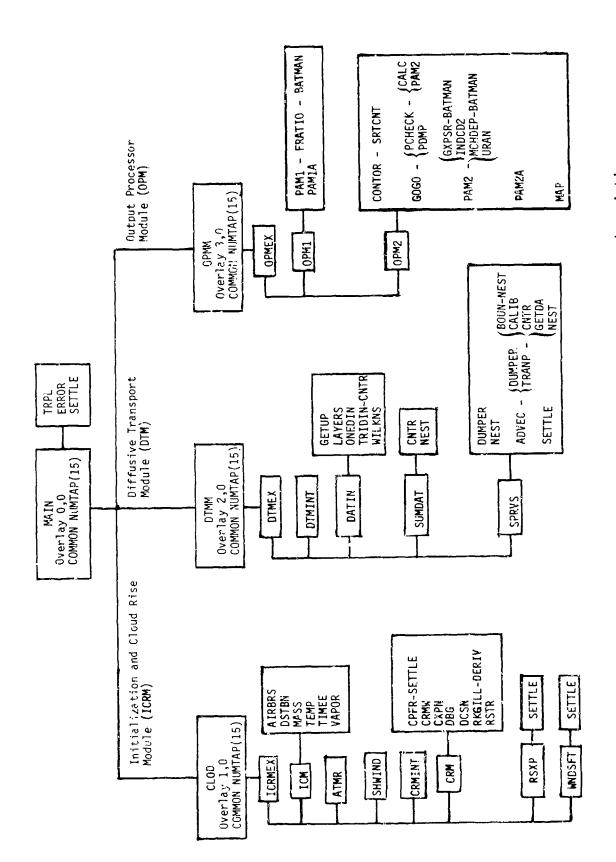
This version of DELFIC operates on the CDC 6600 computer with the over-lay structure given in Fig. 1. The amount of central memory storage required depends on the demands of the problem. Variable dimensioned arrays are used (sec. 2.3). For the example problem (sec. 4), which uses array dimensions

TABLE 1
EXTERNAL STORAGE UNITS USED BY DELFIC

NUMTAP(I) Index, I	Symbolic Name	Module	Use
1	ISIN	ICRM DTM OPM	System unit for card input.
2	ISOUT KOUT	ICRM DTM OPM	System unit for printing.
3	IRISE	ICRM	Temporary storage during atmospheric stability data processing (Subroutine ATMR), and storage of basic data and fallout parcel descriptions in the stabilized cloud before correction of horizontal positions for advective transport during cloud rise. (Subroutines RSXP and WNDSFT).
	IPOUT	DTM	Output of basic data and fallout deposit increment (i.e., grounded parcel) descriptions from the DTM. (Subroutines DTMINT, DUMPER and SPRVS).
	I POUT KPOUT KTAPE	OPM	Input of basic data and fallout deposit increment descriptions to the OPM. (Subroutines OPM1, OPM2, GOGO).
4	JPARN	ICRM	Output of basic data and fallout parcel descriptions in the stabilized cloud after correction of horizontal positions for advective transport during cloud rise. (Subroutine WNDSFT).
	JPARN	DTM	Input of basic data and fallout parcel descriptions to the DTM. (Subroutines DTMINT and SPRVS).
5	JPOUT KTAPE LTAPE	OPM	Temporary storage of fallout deposit increment descriptions for maps that require storage in excess of the OMAP array capacity. (Subroutines OPM2, GOGO and PDMP).

TABLE 1 (con't.)

NUMTAP(I) Index, I	Symbolic Name	Module	Use
6	KPOUT KTAPE LTAPE	OPM	Temporary storage of fallout deposit increment descriptions for maps that require storage in excess of the OMAP array capacity. (Subroutines OPM2, GOGO and PDMP).
7	IPNCH	OPM	System unit for card punch. (Subroutine SRTCNT).
8	МВТАРЕ	0P M	Multiburst output tape. Not currently used. (Subroutine MAP).
9	INPAM INTP	OPM	Fission yield data used for activity calculation (PAM1).



See Table 2 for program descriptions. Organization of the DELFIC code. Figure 1.

11.

TABLE 2

ALPHABETICAL LIST AND DESCRIPTION OF PROGRAMS

Program	Module	Called By	<u>Description</u>
ADVEC	DTM	SPRVS	For each fallout parcel: calls TRANP to transport top and base separately from stabilized cloud to ground im- pact, and recombines impacted top and base to form a single deposit increment of fallout.
AIRBRS	ICRM	ICM	For a pure airburst: sets particle size distribution parameters, and sets time, temperature and mass of debris contained in the initial cloud.
ATMR	ICRM	ICM	Inputs and processes atmospheric stability and humidity data (altitude, temperature, pressure, relative humidity, and optionally, density and viscosity).
BATMAN	ОРМ	FRATIO GXPSR MCHDEP	Computes activity decay chains by means of the Rateman equation (I, eq. $(4.2.1)$).
BOUN	DTM	TRANP	Calculates horizontal coordinates of the point of entrance into a wind data cell of a fallout parcel transported from a contiguous cell.
CALC	OPM	PCHECK	Computes map contributions from individual deposit increments of fallout and adds these to the map ordinate array OMAP.
CALIB	DTM	TRANP	Returns a justified index which relates a point to its corresponding position in a data array.
CNTR	DŢM	SUMDAT TRANP TRIDIN	Returns horizontal coordinates of the center of a wind field space cell.
CONTOR	OPM	OPM2	Determines unordered sets of map points that lie on specified contours.
CPFR	ICRM	CRM	Computes fallout rate from the cloud during its rise.
CRM	ICRM	ICRMX	Executive code for cloud rise calculation.
CRMINT	ICRM	ICRMX	Initialization for the cloud rise calculation.
CRMW	ICRM	CRM	Prints cloud rise history table.
CXPN	ICRM	CRM	Tabulates cloud rise history table and tests for cloud stabilization.

Program	Modul e	Called By	Description
DATIN	DTM	DTMEX	Directs input and processing of wind and turbulence data.
DBG	ICRM	CRM	Prints debug output for the cloud rise calculation.
DCSN	ICRM	CRM	Sets "wet" and "dry" mode switches and tests for abnormal cloud rise.
DERIV	ICRM	RKGILL	Computes differential equation values at each time step during cloud rise.
DSTBN	ICRM	ICM	Computes particle size distribution histogram tables.
DTMEX	DTM		DTM executive code.
DTMINT	DTM	DTMEX	Initializes for the DTM.
DUMPER	DTM	ADVEC SPRVS	Writes deposit increment data onto external unit IPOUT, and prints these data if requested.
FRATIO	OPM	PAM1	Computes parameters for the radial distribution fractionation model, which uses them to distribute activity with particle size.
GETDA	DTM	TRANP	Computes an average wind or turbulence component from the summed data arrays (I, eq. (3.2.3)).
GETUP	DTM	DATIN	Prepares the horizontal space resolution arrays NET and NETSU for a horizontally resolved wind field.
GOGO	OMP	uPM2	Controls flow of deposit increment data to and from external storage, and calls PCHECK to process the data for map preparation.
GXPSR	OPM	PAM2	Computes the distribution of total fission produce activity with particle size, FP.
ICM	ICRM	ICRMEX	Controls input and printing of basic data, and controls calculation of initial conditions in the nuclear cloud.
ICRMEX	ICRM		ICRM executive code.
INDCD2	OPM	PAM2	Computes activity induced in soil lifted by the cloud and adds this to the activity distribution.

Program	<u>Module</u>	Called By	<u>Description</u>
LAYERS	DTM	DATIN	Constructs arrays ZBH and ZCH of atmosphere strata base and center altitudes for a three-dimensionally resolved wind field.
MAP	OPM	OPM2	Constructs and prints fallout maps from the map ordinate array OMAP.
MASS	ICRM	ICM	Returns mass of fallout material in the cloud (fireball) at the initial time for a surface or near surface burst.
MCHDEP	OPM	PAM2	Computes the distribution of a single radioactive mass chain with particle size.
NEST	DTM	SPRVS SUMDAT TRANP BOUN	Given a set of horizontal space coordinates, returns the index of the space net mesh and its horizontal boundary coordinates.
ONEDIN	МТО	DATIN	Inputs and processes wind or turbulence data for a horizontally homogeneous wind field.
OPMEX	ОРМ		OPM executive code.
OPM1	ОРМ	OPMEX	Initializes for the OPM.
OPM2	OPM	OPMEX	Initializes and controls computation for fallout map preparation.
PAM1	ОРМ	0P M1	Executive code for time-independent part of the rigorous activity calculations.
PAM1A	ОРМ	OPM1	Matches fission type parameter FISSID with an activity K factor. Used for pure airbursts and specified sizeactivity particle distributions.
PAM2	OPM	OPM2 PCHECK	Executive code for the time-dependent part of the rigorous activity code. Computes and prints the activity distribution table FP.
PAM2A	OPM	OPM2	Computes and prints the activity distribution table FP for airbursts and specified size-activity distributions.
PCHECK	OPM	G0G0	Computes boundaries of the contribution ellipses for fallout deposit increments. (I, sec. 5.2)

Program	Module	Called <u>Fy</u>	<u>Description</u>
PDMP	OPM	G0 G0	Writes deposit increment data onto an external storage unit for those deposit increments that will contribute to subsequent map sections.
RKGILL	ICRM	CRM	Integrates cloud rise differential equations by a fourth-order Runge-Kutta-Gill algorithm.
RSTR	ICRM	CRM	Preserves or restores cloud properties during integration of the cloud rise differential equations. Operates with RKGILL.
RSKP	ICRM	ICRMEX	Passes through the cloud rise history table constructed during the dynamic cloud rise simulation such as to develop the particle cloud structure.
SETTLE	ICRM DTM	CPFR RSXP SPRVS	Returns still air, gravity settling speed of a sphere when given sphere diameter and density, and atmospheric conditions.
SHWIND	ICRM	ICRMEX	Inputs and processes shot-time wind data for use in computing shear effects on cloud rise and in advecting the particle cloud during the period of cloud rise.
SPRVS	DTM	DTMEX	Controls transport of fallout parcels from the stabilized cloud to ground impact.
SRTCNT	OPM	CONTOR	Orders (approximately) the map contour points determined by CONTOR.
SUMDAT	DTM	DTMEX	Computes weighted sums of wind and turbulence data (I, eq. $(3.2.2)$).
TEMP	ICRM	ICM	Returns temperature of condensed and vapor phase material in the cloud (fireball) at the initial time.
TIMEF	ICRM	ICM	Returns the time at which the initial cloud (fireball) is defined.
TRANP	DTM	ADVEC	Returns impact point coordinates and dispersion variances of a fallout parcel base or top given its coordinates in the stabilized cloud.
TRIDIN	DTM	DATIN	Computes a three-dimensionally resolved wind or turbulence field from input data.

Program	Module	Called <u>By</u>	Description
URAN	OPM	PAM2	Computes activities of ^{239}U and ^{239}Np produced by capture of neutrons by the ^{238}U in the device.
VAPOR	ICRM	ICM	Returns the portion of the fallout mass in the initial cloud (fireball) that is in the vapor state. (This datum not currently used.)
WILKNS	DTM	DATIN	Computes turbulence data via Wilkins' method. (I, sec. 3.3)
WNDSFT	ICRM	ICRMEX	Adjusts horizontal coordinates of individual fallout parcels to account for advective transport during cloud rise and stabilization.

as given in the sec. 5 code listings, about 41000_{10} (120000₈) central memory words, including those used by the operating system, are required. Nine external storage units, including three system I-O units, are required (Table 1).

Computing time is strongly dependent on the scope of the problem in terms of number and type of wind fields, number of fallout parcels transported and number and sizes of maps. To give a general idea of computing time, complete simulations of test shots Johnie Boy (0.5 KT), Jangle-S (1.2 KT), Koon (150 KT) and Zuni (3380 KT) were done in a single run in 609 seconds CPU time on a CDC 6600 computer. Single H + 1 hour normalized exposure rate maps were produced for each. Wind fields were defined by single, updated profiles, and 100 particle size classes and 20 cloud subdivisions were defined for each. Layer-by-layer transport was used. Wind updates and numbers of map points were:

Shat	Number of Wind Updates	Number of Map Points
Johnie Boy	2	846
Jangle-S	3	3538
Koon	3	1513
Zuni	6	1829

2.3 VARIABLE DIMENSIONED ARRAYS

5. 个时间,不是是是是不是一个,我们就是一个人,我们就是这种人的,我们就是一个人,也是一个人,也是一个人,也是是一个人,也是是一个人,也是是一个人,也是一个人,

Variable dimensioned arrays are used in two modules: DTM and OPM. In the OPM there is only one such array, OMAP, the map ordinate array. The user may change the size of this array by changing two numbers in Subroutine OPMEX. These are the dimensions of the OMAP array and the value of the parameter NMAP (lines 133 and 135 of Subroutine OPMEX); NMAP should equal the OMAP array dimension.*

^{*}DELFIC is programmed to accommodate maps with numbers of points greater than NMAP (sec. 2.5).

For the DTM the situation is more complex in that there are fifteen arrays, many of which are multiply dimensioned. These arrays all are involved in space and time resolution of the wind field.

In spatially resolving the wind field we separate horizontal from vertical resolution since at each vertical stratum we find an identical horizontal net. Thus, the parameter NDATF is at least as large as the total number of mesh units in the horizontal net, and KBHF is at least as large as the number of vertical strata. The parameter LTIMF is at least as large as the total number of updates, including the initial wind field. See lines 128 and 129 of the DTMEX FORTRAN listing. For the other parameters on these lines of the listing: ICF and JCF are at least as large as the numbers of subdivisions (i.e., mesh units) along the x and y axis respectively of the "control" horizontal space resolution net (Appendix A); NCF is at least as large as 4*(maximum number of zeros punched in MARY input cards for any level of mesh subdivision); MARF > MAX1(ICF*JCF,NCF).

For wind field: that are not spatially resolved in the horizontal, much central memory storage is saved by the following designations: NDATF = ICF = JCF = NCF = MARF = 1.

The arrays on lines 122 through 127 of the DTMEX code listing must be dimensioned to be consistent with the integer quantities discussed above. Specifically, we must have:

NET(ICF,JCF),NETSU(NCF),WAVG(KBHF,LTIMF)
USUM(KBHF,NDATF,LTIMF),VSUM(KBHF,NDATF,LTIMF)
DXSUM(KBHF,NDATF,LTIMF),DYSUM(KBHF,NDATF,LTIMF)
RSUM(KBHF,NDATF,LTIMF),CAVS(KBHF),HDAV(LTIMF)
ZBH(KBHF),ZCH(KBHF),TIMUP(LTIMF),MARY(MARF)
WFZ(KBHF,NDATF,LTIMF),TSUM(KBHF).

Thus, if for a particular case we have ICF = 3, JCF = 4, NCF = 8, KBHF = 13, LTIMF = 1, then NDATF = 18 and MARF = 12, and we should have

NET(3,4),NETSU(8),WAVG(13,1) USUM(13,18,1),VSUM(13,18,1) etc.

2.4 MAP SPECIFICATION

All maps are rectangular with west-to-east (x axis), south-to-north (y axis) orientation. Boundary coordinates and at least one of the two grid spacings (the x axis spacing) must be specified. If the y axis grid spacing is not specified, the code sets it on the assumption of 10 and 6 printed characters per inch in the horizontal (x axis) and vertical (y axis) directions on the printer paper such as to produce a spatially undistorted map.

Along with the boundaries and grid intervals, the user may specify a combined ground roughness-survey meter response correction factor which sometimes is warranted in comparing calculated with observed exposure or exposure rate fallout maps. Predicted exposure rates are based on laboratory measurements of fission product yields and on factors called exposure rate multipliers that convert the fission yields for individual nuclides to exposure rates at one meter height above an infinite plane on which the fission products are assumed to be uniformly distributed. One correction, the ground roughness factor, is required to account for absorption of radiation by small irregularities, or roughness elements, in an actual ground surface. The other correction is necessary to account for variation of response of survey meters to radiation over the spectrum of wave lengths encountered. Ground roughness factors for Nevada Test Site terrains are estimated to be in the range of 0.70 to 0.75, and an instrument response factor of about 0.75 is appropriate for commonly used survey meters. The product of these two factors is approximately 0.5, and this factor is commonly applied to calculated fallout patterns for test shots whose fallout activity was measured over land. On default of input, this parameter (GRUFF) is set to unity.

Any number of maps can be requested (Table 3) for a set of dimensional specifications as discussed above. These dimensional specifications can be changed and another set of maps can be requested, etc., in the same run.

Along with a map request, the user may specify certain other parameters (in addition to a mass chain specification for map option 14 and T1 and T2 which are required for various options). These are:

TABLE 3

MAP REQUEST OPTIONS

Map Option Code, NREQ	Description
0	Termination of request set.
I.	Count of fallout deposit increments that contribute to each map ordinate.
2	Exposure rate normalized * to H + 1 hour (Roentgen hr ⁻¹).
3	Exposure rate at time H + T1 hours, accounting for time of arrival of fallout. (Roentgen hr^{-1}).
4	H + 1 hour normalized exposure rate resulting from particles in diameter range T1 to T2 micrometers.** (Roentgen hr ⁻¹).
5	Integrated exposure from H + T1 hours to infinity, accounting for time of arrival of fallout by the approximate method. (Roentgen).
6	Integrated exposure from H \pm T1 to H \pm T2 hours, accounting for time of arrival of fallout by the approximate method. \pm (Roentgen).
7	Integrated exposure from H + T1 to H + T2 hours assuming all fallout has arrived by H + T1 hours. (Roentgen).
8	Integrated exposure from H + T1 hours to infinity assuming all fallout has arrived by H + T1 hours. (Roentgen).
9	Integrated exposure from H + T1 hours to infinity, accounting for time of arrival of fallout by the exact method. ++ (Roentgen).
10	Integrated exposure from $H+T1$ to $H+T2$ hours, accounting for time of arrival of fallout by the exact method. (Roentgen).
11	Mass of fallout per unit area (kg m^{-3}).

Map Option Code, NREQ	Description
12	Mass of fallout per unit area deposited from $H + T1$ to $H + T2$ hours (kg m^{-3}).
13	Mass of fallout per unit area deposited by particles in diameter range T1 to T2 micrometers.** (kg m^{-3}).
14	Activity per unit area from an individual mass chain at T1 hours in units of curies m^{-2} , or in equivalent fissions m^{-2} if T1 = 0.
15	Time of onset of failout. (s)
16	Time of cession of fallout. (s)
17	Diameter of smallest particle deposited. (μm)
18	Diameter of largest particle deposited. (μm)

A "normalized" calculation is one in which it is assumed that all fallout is deposited by H + t regardless of actual deposition time.

When specifying T1 and T2 particle diameters, make T1 slightly smaller and T2 slightly larger than the tabulated central diameters for the particle size classes.

The $t^{-1\cdot 25}$ decay factor is used to compute exposure rate at times other than H + 1 hour (I, sec. 4.3), though activity at H + 1 hour may be calculated by the exact method. (See I, sec. 4.1)

Warning: This calculation probably will consume a lot of computer time. A complete activity calculation is done for each deposit increment of fallout. Consider using one of the approximate methods (requests 5 and 6).

- 1. A parameter that specifies which of two optional formats is to be used to print map ordinate values. These are:
 - a. The two-line E format,

NNNNNN

± V.VVV,

which is to be interpreted as

 \pm V.VVV \times 10^{NNNNNN}

b. The two-line F 11.3 format

NNNNN

± V.VVV,

which is to be interpreted as ± NNNNNV.VVV.

The two-line E format is used on specification default.

2. Parameters QCUT and CUTMAP which define lower thresholds for acceptance of contributions from single deposit increments and cumulative contributions respectively. Thus any contribution at any map point with value less than QCUT is ignored, and any total contribution at any point less than CUTMAP is set to zero. If not specified by the user, these parameters are set by the code to values consistent with the type of map requested and the time after detonation. (QCUT is the same as ω_{\min} of I, sec. 5.2; also see Appendix B)

(Subroutine OPM2)

2.5 MAP SIZE

Fallout map ordinate values are stored in an array OMAP with single, variable dimension NMAP (sec. 2.3). While only NMAP points can be stored in central memory, there is almost no limitation on map size.* Maps that require

The only limitation on map size is that there be space in central memory for at least two y axis columns of points.

points in excess of NMAP are computed and printed in sections. The code determines the number of sections required (Subroutinc OPM2) and during computation of each, writes deposit increment data that may contribute to subsequent sections on external storage units (Subroutine PDMP).

2.6 CONTOUR POINT DATA

For any map that can be wholly contained in the OMAP array (i.e., with less than NMAP points, see sec. 2.5), x,y coordinates of points on as many as eight contours can be punched and printed. Subroutine CONTOR determines the coordinates by straightforward linear interpolation, and Subroutine SRTCNT attempts to order them in sequence around closed contours. Multiple closures are accommodated. The ordering procedure is simple: each point is followed by the point closest to it which has not yet been sequenced. When the next point turns out to be the first point in the sequence, the contour is closed. Thus, the first and last points in the list for a closed contour are identical.

This simple ordering procedure may produce false closures and crossovers. Thus, the user must plot the contours by hand and compare the contour points with the plots carefully before attempting to use them.

3. DATA INPUT

3.1 INITIALIZATION AND CLOUD RISE MODULE CARD DESCRIPTIONS

Card No.	Variables and Format		Da t	a Description	
1	DETID(12),(12A6)	ICRM run identification			
2	IC(20),(20I4)	Control	Integers:		
		<u>I</u>	IC(I)	Action	
		1	0	lognormal particle size distribution	
			1	nower-law particle size distribution	
			2	tabular particle size distribution (I, sec. 2.1.6)	
		2	0	siliceous soil (continental soil, including Nevada Test Site)	
			1	calcareous soil (coral soil, includ- ing Pacific islands) (see card 3 below	
		3	IF(IC(3).GT.υ)	causes return after print of initial conditions. Otherwise calculation proceeds to cloud rise simulation.	
		4	KATM	atmosphere stability data (altitude, temp., press., relative humidity, density viscosity) print skip integer. If KATM=0, do not print data. KATM=N, print data at every Nth altitude increment of 200m beginning at -1000 > 200(KATM-1)m to 50 km.	
		5	IF(IC(5).NE.O)	take particle distribution to be a diameter-activity fraction distribution. Otherwise take it to be a diameter-particle number (or mass fraction) distribution. Normally, IC(5) is left blank.	
		6	IF(IC(6).NE.0)	causes printout of cloud rise debug data. (Subroutine DBG)	
3	W,FW,HEIGHT,ZBRSTZ, SLDTMP,PHI,(8F10.0)	HEIGHT = ZBRSTZ = SLDTMP = defau The c this PHI = fr	temperature (°K) of lt values: siliceon calcared listribution of active temperature. (I,sectaction of available	ove ground zero (m), to sea level of ground zero (m) F soil solidification. (I,sec.2.1.2) us soil = 2200°K (see card 2) ovity with particle size is sensitive to c. 4.2.2) energy in the cloud at the initial time soil. The remainder is used to vaporize	
4	NDSTR,KDI,IRAD, (2014)	KDI = IRAD =	gram. Default value tabular particle size (I, sec. 2.1.6 and / number of vertical of for each particle s	cloud subdivisions in the initial cloud records. Default value = 15 + ln(W). Defivision parameter. Normally this is	

ICRM Card Descriptions

Card No.	Variables and Format	Data Description
5	XGZ.YGZ,TGZ,(8F10.0)	XGZ = x coordinate (west to east, m) of ground zero YGZ = y coordinate (south to north, m) of ground zero TGZ = detonation time (s) Normally, this card is blank.
62	DNS,DMEAN,SD, (8F10.0)	For lognormal particle size distribution (IC(1) = 0 in card 2) DNS = fallout particle density (g cm $^{-3}$). Default value = 2.6 DMEAN = median diameter of the particle number vs. diameter distribution (µm). Default value = 0.407 µm and SD = 4.0 SD = geometric standard deviarion of the particle number vs. diameter distribution (dimensionless) (I,sec. 2.1.6 and I, Appendix A)
6p	DNS,CAYM,EXPO, (8F10.0)	For power-law particle size distribution (IC(1) = 1 on card 2) DNS = same as for 62. CAYM = $k/mass$ ratio ($mEXPO-1$ kg^{-1}) EXPO = exponential parameter X (dimensionless) (I, sec. 2.1.6 and I, Appendix B)
6t	DNS,(8F10.U)	For tabular particle size distribution. (IC(1) = 2 on card 2) DNS = same as for 6% (I, sec. 2.1.6)
6t:1	DIAM(1) FMASS(1)	For tabular particle size distribution only. (IC(1) = 2 on card 2) DIAM(I) = upper (i.e., larger particle) boundary diameter of the Ith particle size class FMASS(I) = mass or activity fraction (depending on value of IC(5) on card 2) in the Ith particle size class DIAM(NDSTR+1) = lower (i.e., smaller particle) boundary diameter of the NDSTRth particle size class The tabulation begins with the largest particle and continues in order to the smallest. (I, sec. 2.1.6)
	Cards 1 - 6 are read by Begin atmospheric stabil	Subroutine ICM. ity data input via Subroutine ATMR.
7	ATID(12), (12A6)	Atmospheric stability data identification.
8	FMT(12), (12A6)	Atmospheric stability data object-time format. (See cards 11)
9	SCALE(8), (8F10.0)	Atmospheric stability data scale factors. Default values for SCALE(1) through SCALE(6) = 1.0. (See cards 11)
10	N1,N2,N3,N4,N5,N6, (2014)	Atmospheric stability data input field pointers. (See cards 11)

ICRM Card Descriptions

Card		
No.	Variables and Format	Data Description
11:1 11:NAT	AP(6), (FMT, see card 8)	Altitude (m) = (AP(N1) + SCALE(7)) * SCALE(1) (relative to sea level) Temperature (°K) = (AP(N2) + SCALE(8)) * SCALE(2) Pressure (Pa) = AP(N3) * SCALE(3) Relative Humidity (%) = AP(N4) * SCALE(4) Density (kg m ⁻³) = AP(N5) * SCALE(5) Dynamic Viscosity (kg m ⁻¹ s ⁻¹) = AP(N6) * SCALE(6) Either all quantities may be specified or as few as four may be specified, but altitude, temperature, relative humidity and either of pressure or density must be specified; the missing quantities are computed by the program. The field pointers N1, N2, etc., are from card 10 and the scale factors, SCALE(I), are from card 3. The program interpolates the data into arrays at 200m altitude intervals from -1000m to 50 km altitude (relative to sea level), and supplies standard data at -1000m and 50 km if not specified.
12	AP(N1) = 999999., (FMT, see cards 8 and 11)	Atmosphere data terminator.
	to account for effec	Jata input via Subroutine SHWIND. These winds are used ts of wind shear on the cloud rise, and to advect fallout rise and stabilization.
13	FORM (6X, A4)	Two options are allowed: FORM ≡ WIND∆AMETEOROLOGICAL (cols. 1 - 20) for wind data in meteorological format; that is in terms of: altitude, speed, and angle (clockwise from north) from which the wind is coming. FORM ≡ WIND∆ARESOLVED (cols. 1 - 14) for wind data in resolved form; that is in terms of altitude and x(west to east) and y(south to north) wind components.
14	FMT(12), (12A6)	Wind data object-time format (see cards 17)
15	SCALE(5), (8F10.)	Wind data scale factors. Default values for SCALE(1) through SCALE(3) = 1.0. (See cards 17)
16	N1,N2,N3, (2014)	Wind data input field pointers. (See cards 17)

^{*}Mere and elsewhere in this section the symbol Δ indicates a blank column in a punched card.

ICRM Card Descriptions

Card No.	Variables and Format	Data Description
17:1 : : : : 17:68~55	AP(3), (FMT, see card 14)	For FORM = WINDΔΔMETEOROLOGICAL (card 13): Altitude (m) = (AP(N1) + SCALE(4)) * SCALE(1) (relative to sea level) VX(m s ⁻¹) = AP(N3) * SCALE(?) * SIN(π/180.(AP(N2) * SCALE(3)
		Here VX and VY are wind components in the west-to-east and south-to-north directions respectively; the scale factors, SCALE(I), are from card 15 and the field pointers, N1, N2, N3, are from card 16.
18	AP(N1) = 999999. (FMT, see cards 14 and 17)	Wind data terminator.

3.2 DIFFUSIVE TRANSPORT MODULE CARD DESCRIPTIONS

Card No.	Variables and Format		Data	a Description
1	DTMID(12), (12A6)	DTM run i	dentification	
2	MC(20), (2014)	Control i	ntegers:	
		<u>I</u>	MC(I)	Action
		1	0	Wind field is horizontally homo- geneous (i.e., not spatially re- solved in the horizontal). At any time, the wind field is defined by a single vertical profile of two- dimensional vectors; vertical wind components are taken to be zero.
			IF(MC(1).NE.O)	The wind field is resolved in three dimensions, and three-dimensional wind vectors are considered.
		2	0	Print raw and processed wind and turbulence data before weighted sums (I, eq. (3.2.2)) are computed.
			1	Do not print above.
			2	Print above (i.e., as though MC(2)=0) plus print the data after weighting and summing (I, eq. (3.2.2)). The latter includes weighted-summed vector orientation angles (I, sec. 3.4

Card	Vanishler and Format		Na ta	Description
<u>No.</u> 2 (con't.)	Variables and Format MC(20), (2014)	Control	integers:	DESCH TPUTON
2 (0011 0.)	MG(20), (2014)		MC(I)	Action
		<u>I</u> 3	0	Do not print fallout parcel descriptions before and after transport.
			IF(MC(3).GT.O)	Print fallout parcel descriptions before transport.
			IF(MC(3).GT.1)	Print deposit increment descriptions.
		4	0	Quick transport is specified (I, sec. 3.2.2)
			1	Layer-by-layer transport is specified (I, sec. 3.2.1)
		5	IF(MC(5).NE.1)	Suppresses debug print from Sub-routine TRANP.
			1	Causes debug print from Subroutine TRANP. Caution: this print is voluminous.
		6	0	Sets ratio of the Lagrangian time scale of turbulence to the Eulerian length scale of turbulence, T _L /D _E , to unity in the settling speed correction for turbulent dispersion. This option gives realistic results.
			1	Sets $T_L/D_L = \beta/\sigma_w$ where $\beta = 4$ and σ_w is Standard deviation of vertical turbulence. (I, sec. 3.3)
3	ICX, JCX, NSEQ, (2014)	wind JCX = sa NSEQ = s in th ahead Default	field horizontal spane as ICX but for the sequence number of the parcel description of the NSEQth parcel values are unity for	s along the x(west-east) axis of the ace resolution "control" net (Appendix A) he y(south-north) axis. he first fallout parcel to be processed ns list supplied by the ICRM. Parcels el in the list are bypassed. r all three parameters. For a horidal field, this card is normally blank.
4	WINT,XLLC,YLLC, TIMEH, EDDY, (8F10.0)	XLLC = C YLLC ; a a TIMEH= 1 EDDY = 1	'control" net (Appenvind field, specify or ordinates of the sport space (i.e., he and south-to-north day horizontally homognumbers consistent was transport time limit ratio of Lagrangian	to Eulerian turbulence time scales ß (see nd I, footnote p. 35). Default value = 4.

Card No.	Variables and Format	Data Description
	Cards 1 - 4 are read by 5 bro Begin wind and turbulence dat DATIN and ONEDIN (MC(1) = Vertical components are not c	a for a horizontally homogeneous wind field read by Subroutines 0).
5h	SPEC, FORM, LTIM, UPTIMH, (A4, 2X, A4, 18X, I2, F10.0)	SPEC is used to distinguish wind data from turbulence data and to terminate the input of data sets. FORM distinguishes two types of wind data: meteorological and resolved (see ICRM card 13), and two modes of turbulence data specification: card input and calculate by Wilkins' method (I, sec. 3.3). The options for SPEC and FORM are punched as: WINDAAMETEOROLOGICAL (Cols. 1 - 20) WINDAAMETEOROLOGICAL (Cols. 1 - 20) TURBAAWILKINSAMETHOD (Cols. 1 - 20) TURBAAINPUTADATA (Cols. 1 - 16) NOAMOREADATA (Cols. 1 - 12) The NO MORE DATA card is the last DTM input card.
		LTIM = wind or turbulence field update sequence integer. The shot-time field is update number 1. LTIM = 1 winds must be input first (Cols. 29 - 30).
		UPTIMH = time (hrs.) at which update LTIM begins. (Note: For each wind update there must be a turbulence update.)
6h	FMT(12), (12A6)	Object-time format for wind or turbulence data. (See cards 9h)
7h	SCALE(5), (8F10.0)	Data scale factors. Default values for SCALE(1) through SCALE(3) = 1.0. (See cards 9h.)
8h	N1, N2, N3	Data input field pointers. (See cards 9h.)
9h:1	AP(3), (FMT, see card 6h) AP(3)	For both wind and turbulence data, the processing is as for ICRM cards 13 - 17. Turbulence data must be specified as FORM \equiv INPUTADATA (card 5h); it must be input in the resolved format, and after processing must consist of turbulence energy density dissipation rates, ϵ , ($\rm m^2~s^{-3}$) (I, sec. 3.3).
10h	AP(N1) = 999999., (FMT, see cards 6h and 9h)	Data set terminator.
	Cards 5h through 10h are repea which FORM = INPUT DATA (card	ated for each wind update, and for each turbulence field for 5h).
	Begin data to define the three The same space grid is used for	e-dimensional wind and turbulence field grid. (MC(1).N'0) or all updates. Data read by Subroutines GETUP and LAVERS.

ard <u>o.</u>	Variables and Format	Data Description
r:1 •	MARY(!), #ARY(2),	Horizontal space resolution net mesh subdivision flags. (Appendix A)
	•	
	•	
r:N	, MARY(MARX),(3612)	
r	TLAYR, (11X, A4)	Indicates whether the data to follow represent base or center altitudes of the atmosphere vertical strata: WINDALAYERACENTERAALTITUDES (Cols. 1 -27)
		or WIND∆LAYER∆BASE∆ALTITUDES (Cols. 1 - 25)
r:1	ZCH(1), ZCH(2),	Vertical strata base or center altitudes (m relative to sea level) as indicated on card 6r.
:	· ·	
4 :N	, ZCH(KBHX), 999999.,	
VE	(8F10.0) egin data for the three-dimension ectors are considered (MC(1).NE. ata read by Subroutines DATIN an	
ve Da	egin data for the three-dimension ectors are considered (MC(1).NE. ata read by Subroutines DATIN an SPEC, FORM, LTIM, UPTIMH (A4, 2X, A4,	0).
Ve Da	egin data for the three-dimension actors are considered (MC(1).NE. ata read by Subroutines DATIN and SPEC, FORM, LTIM,	O). d TRIDIN. Same as card 5h ALPHA = vertical limiting distance used by the interpolation
VE	egin data for the three-dimension actors are considered (MC(1).NE. ata read by Subroutines DATIN and SPEC, FORM, LTIM, UPTIMH (A4, 2X, A4, 18X, I2, F10.0) ALPHA, BETA, NN,	O). Ind TRIDIN. Same as card 5h ALPHA = vertical limiting distance used by the interpolation method which fills in the three-dimensional atmospheric space grid cells from the data to follow (corresponds)
ve Da 	egin data for the three-dimension actors are considered (MC(1).NE. ata read by Subroutines DATIN and SPEC, FORM, LTIM, UPTIMH (A4, 2X, A4, 18X, I2, F10.0) ALPHA, BETA, NN,	O). Ind TRIDIN. Same as card 5h ALPHA = vertical limiting distance used by the interpolation method which fills in the three-dimensional atmospheric space grid cells from the data to follow (corresponds to α in I, eq. (3.5.2)) BETA = same as ALPHA but for the horizontal plane. NN = number of nearest data vectors used by the interpolatic method in filling in the atmospheric space grid cells from the data to follow (corresponds to N in I, eqs.
ve Da	egin data for the three-dimension actors are considered (MC(1).NE. ata read by Subroutines DATIN and SPEC, FORM, LTIM, UPTIMH (A4, 2X, A4, 18X, I2, F10.0) ALPHA, BETA, NN, (2F10.0, I4)	O). Ind TRIDIN. Same as card 5h ALPHA = vertical limiting distance used by the interpolation method which fills in the three-dimensional atmospheric space grid cells from the data to follow (corresponds to α in I, eq. (3.5.2)) BETA = same as ALPHA but for the horizontal plane. NN = number of nearest data vectors used by the interpolatic method in filling in the atmospheric space grid cells from the data to follow (corresponds to N in I, eqs. (3.5.1) and (3.5.2)).

No.	Variables and Format	Data Description
13r:1	AP(6), (FMT, see card 10r)	z (m, altitude relative to sea level) = (AP(N1)+SCALE(4))*SCALE(1 x (m, in west to east direction) = (AP(N5)+SCALE(7))*SCALE(6) y (m, in south to north direction) = (AP(N6)+SCALE(8))*SCALE(6) vertical wind component (m s ⁻¹) = AP(N4)*SCALE(2) For FORM = METEOROLOGICAL: VX(m s ⁻¹) = AP(N3)*SCALE(2)*SIN(π/180. (AP(N2)*SCALE(3)+ SCALE(5)*SCALE(3) -180.)) VY(m s ⁻¹) = AP(N3)*SCALE(2)*COS(π/180. (AP(N2)*SCALE(3)+ SCALE(5)*SCALE(3) -180.)) For FORM = RESOLVED: VX(m s ⁻¹) or DX(m ² s ⁻³) = AP(N2)*SCALE(2) VY(m s ⁻¹) or DY(m ² s ⁻³) = AP(N3)*SCALE(2) Turbulence data must be specified by FORM = INPUTΔDATA (see cards 5h and 8r); it must be in the resolved format, and after process-
14r	AP(N1) = 999999.,	ing must consist of turbulence energy density dissipation rates, ε , (m^2sec^{-3}) . Vertical turbulence components are not used.
171	(FMT, see cards 10r and 13r)	bata set terminator.
<u>.</u>	FORM ≅ INPUTADĂTA (Card 8r). Begin specification of turbule	ted for each wind update and for each turbulence field for which nce field to be calculated by Wilkins method. Applies to homogeneous
	FORM = INPUTADĂTA (Card 8r). Begin specification of turbuler and nonhomogeneous data fields tropic. (I, sec. 3.3). Data are read by Subroutines DA SPEC, FORM, LTIM,	nce 'ield to be calculated by Wilkins method. Applies to homogeneous (MC(1) = 0 and MC(1).NE.O), and the turbulence is horizontally iso-ATIN and WILKNS. Same as cards 5h and 8r except that SPEC and FORM are limited to
	FORM = INPUTADĂTA (Card 8r). Begin specification of turbuler and nonhomogeneous data fields tropic. (I, sec. 3.3). Data are read by Subroutines Data	nce field to be calculated by Wilkins method. Applies to homogeneous $(MC(1) = 0 \text{ and } MC(1).NE.0)$, and the turbulence is horizontally iso-ATIN and WILKNS.
 5t	FORM ≡ INPUTADĂTA (Card 8r). Begin specification of turbuler and nonhomogeneous data fields tropic. (I, sec. 3.3). Data are read by Subroutines DA SPEC, FORM, LTIM, UPTIMH, (A4, 2X, A4,	nce field to be calculated by Wilkins method. Applies to homogeneous (MC(1) = 0 and MC(1).NE.O), and the turbulence is horizontally iso-ATIN and WILKNS. Same as cards 5h and 8r except that SPEC and FORM are limited to TURBΔΔWILKINSΔMETHOD (Cols. 1 - 20) U = surface wind speed (m s ⁻¹)
 5t	FORM ≅ INPUTADĂTA (Card 8r). Begin specification of turbuler and nonhomogeneous data fields tropic. (I, sec. 3.3). Data are read by Subroutines DA SPEC, FORM, LTIM, UPTIMH, (A4, 2X, A4, 18X, I2, F10.0)	nce field to be calculated by Wilkins method. Applies to homogeneous (MC(1) = 0 and MC(1).NE.0), and the turbulence is horizontally iso-ATIN and WILKNS. Same as cards 5h and 8r except that SPEC and FORM are limited to:
.	FORM ≡ INPUTADĂTA (Card 8r). Begin specification of turbuler and nonhomogeneous data fields tropic. (I, sec. 3.3). Data are read by Subroutines DA SPEC, FORM, LTIM, UPTIMH, (A4, 2X, A4, 18X, I2, F10.0) U, ZM, ZO, RL, (4F10.0)	nce 'ield to be calculated by Wilkins method. Applies to homogeneous (MC(1) = 0 and MC(1).NE.O), and the turbulence is horizontally iso-ATIN and WILKNS. Same as cards 5h and 8r except that SPEC and FORM are limited to: TURBΔΔWILKINSΔMETHOD (Cols. 1 - 20) U = surface wind speed (m s ⁻¹) ZM = heigh*, above ground (m) at which U is measured (usually 10m) ZO = aerodynamic surface roughness length (m) RL = reciprocal of Monin-Obukhov length (m ⁻¹) These quantities are used to compute ε as a function of altitude by eq. (I, 3.3.4). On default (blank card), ε is computed as a

3.3 OUTPUT PROCESSOR MODULE CARD DESCRIPTIONS

Card No.	Variables and Format		_ Da	ta Description
1	OPMID(12), (12A6)	OPM run i	dentification.	
2	IC(20), (2014)	Control I	ntegers:	
		<u>Ī</u>	IC(I)	Action
		1	IF(IC(1).GT.O)	Do not call PAM1 or PAM1A to perform the time invarient part of the particle activity calculation and stop after preliminary processing and printout.
		2	IF(IC(2).GT.O)	Print all of the deposit increment descriptions received from the DTM
3	NPRNT(6), NPRNT(7),	Particle	activity calculati	on data print control:
	NPRNT(9)→NPRNT(13), NPRNT(15), (8L1)	<u>Index</u>	Printout if	NPRNT(Index) = true
		6	Refractory	Fractions (FR)
		7	Square Roo	t of FR (BSUBK)
		9	This optio	undances (Warning - n combined with JD = bury you in paper)
		10		oduct Activity vs. (Warning - see 9)
		11	Induced Ac Part Size	tivity (Soil) vs. (Warning - see 9)
		12	Induced Ac Part Size	tivity (Mass 239) vs. (Warning – see 9)
		13	Selected M vs. Part S	ass Chain Activity ize
			The array FP of to printed if NPRNT(1 blank.	tal activity with particle size is 5) = false. Normally this card is
4	FISSID, EMITN,	FISSID =	fission type. One	of the twelve types listed on p. 43
	CAPFIS, (A6, 4X,		of Vol. I. For ex	ample, FISSID ≡ U235HE (Cols. 1 - 6).
	2F10.3)	EMITIM =	pute induced activ to continental (si	produced per fission. Used to comity in soil fallout. Applicable only licerus) soils. IF(EMITN.LE.O.O)
		CAPFIS =	to compute induced applicable unless	s not computed. See a captured by ²³⁸ IJ per fission. Used activity in device material. Not FISSID specifies a ²³⁸ U type of S.EQ.O.O) induced activity in ²³⁸ IJ

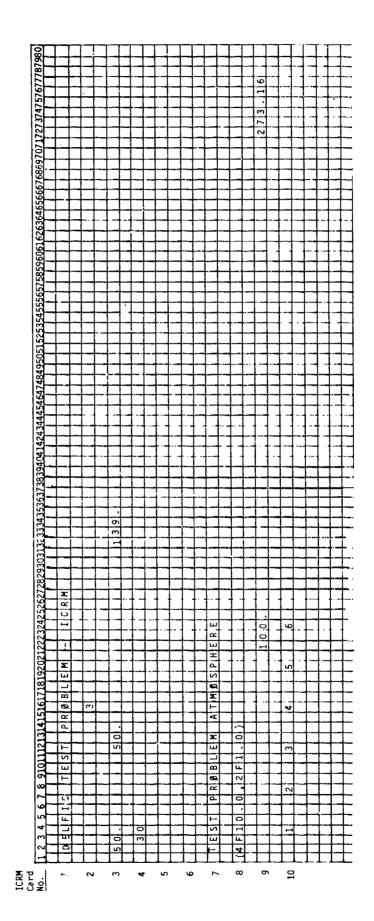
Card No.	Variables and Format	Data Description
5	XMIN,XMAX,YMIN,YMAX, DGX,DGY,GRUFF, (7F10.3)	XMIN are the minimum and maximum map coordinates (m) in the $XMAX$ west-to-east direction.
		YMIN are the minimum and maximum map coordinates (m) in the YMAX south-to-north direction (m).
		DGX are the map grid intervals (m) in the west-east and south- DGY north directions respectively.
		If DGY is not specified, it is computed by the program to produce a spatially undistorted map (sec. 2.4).
		GRUFF = a combined ground roughness-survey instrument correction factor sometimes applied to calculated map ordinate values. To compare calculated with observed test shot activity data observed over land, GRUFF ≈ 0.5. Default value = 1.0. (sec. 2.4)
6	NREQ,JC,ICONT,MASCHN, T1,T2,QCUT,CUTMAP, (415,4F10.0)	Map request card. A map with geometry as specified on the preceding card 5 is computed and printed according to:
		NREQ = map request option code. (See Table 3.) JC = 0 or 1, print the map with the two-line E format JC = 2, print the map with the two-line F11.3 format (sec. 2.4)
		ICONT ≤ 0 do not compute contour points and do not read cards 7 and 8.
		ICONT = 1 print and punch x,y map coordinate points on the contours specified on card 7, providing a nonblank label is specified on card 8.
		ICONT > 1 compute and print x,y map coordinate points on the contours specified on card 7 provided a nonblank label is entered on card 8. Do not punch the data.
		Applicable only to maps that can be wholly contained by the ordinate array OMAP(NMAP).
		MASCHN Atomic mass number of the mass chain for which activity is to be calculated. Applicable only for NREQ = 14. (See Table 3.)
		T1.T2 time range (hrs relative to detonation) or particle diameter range (μm) for activity or other calculations. (See Table 3.)
		QCUT threshold value for acceptance of a contribution at any map point from an individual fallout deposit increment.
		Computed by the program if not specified. CUTMAP threshold value for print of a completed map ordinate value. Computed by the program if not specified.
7	CONTUR(8),(8F10.0)	Read only if ICONT.NE.O (card 6). Values of activity or other quantity, depending on type of map, for which map x,y coordinates are to be printed and punched. These data can be used for contour plotting. A maximum of eight values are allowed per map. Restricted to maps that can be wholly contained in the ordinate array OMAP(NMAP). (sec. 2.6)

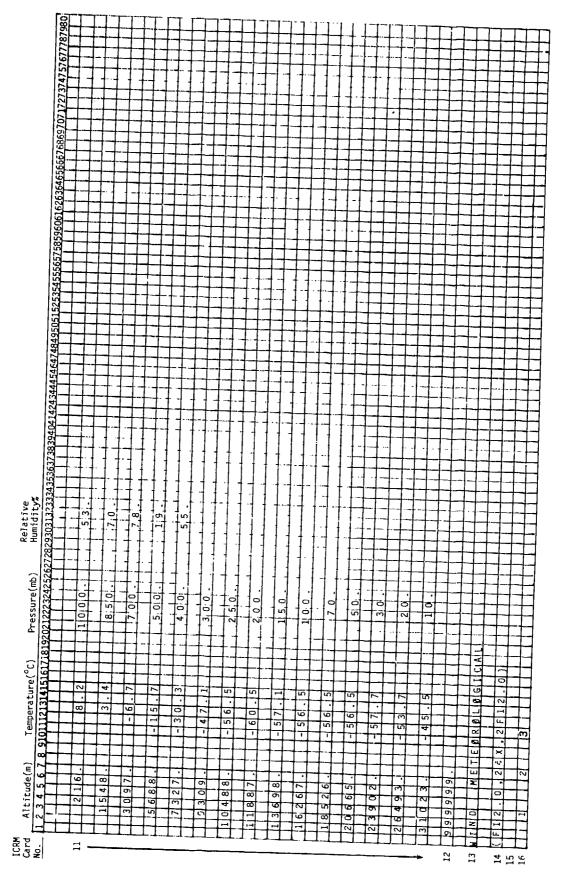
Card No.	Variables and Format	Data Description	
8	CRDLBL,(A10)	Read only if ICONT.NE.O (Card 6). Label to be punched in each contour card resulting from the card 7 specifications. Print and punch of these data will not occur unless a nonblank label is specified.	
	Card 6, and cards 7 and 8 if necessary, are repeated for as many maps as desired with the geometry specified by the preceding card 5; a blank card 6 terminates map production for this geometry.		
		new map geometry, and is followed by a set of cards 6 and e run is terminated by a blank card 5.	

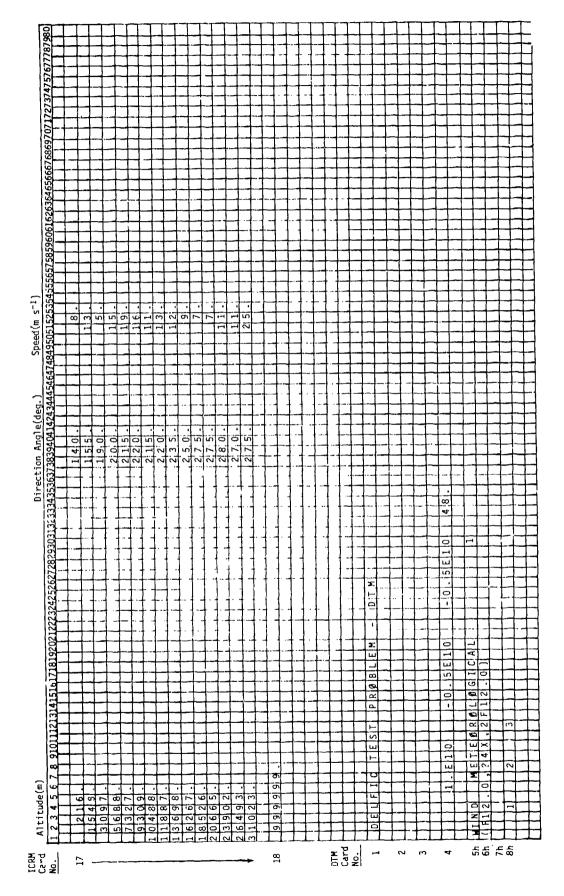
3.4 PAM TAPE DATA

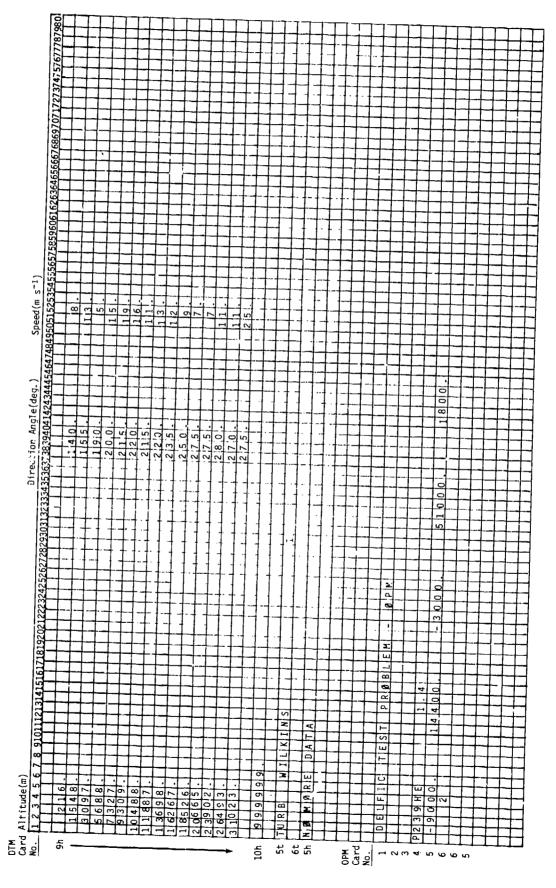
Fission yield data are input to the Particle Activity Submodule (Subroutine PAM1) from external unit INPAM (Table 1). The data are in twelve blocks of 692 words, each block preceded by a six-character fission-type identification corresponding to the twelve FISSID designations. (See I, sec. 4.1 and OPM card 4.) Formats are (A6) and (5E14.6). The data are listed in Appendix C.

4.1 CARD INPUT









PRINTED OUTPUT

The control of the co

C

w s BOICFION ur OL F ⊃ c **4** 11 00 X (1) u (1) E D N 11 2 1 8 π _

* *

INITIALIZATION AND CLOUD PTOE MODULE

PREPARED BY
AT40SPHERIC SCIENCE ASSOCIATES
BETFORT, MASS.

DELFIC TEST PPOPLEM - ICEM **** POILVOILLINGE PIG ****

و u **** 0 C

...c (.5GuGGE+G2) KT HETERS (0. .1390NE+93 METERS SILICEOUS **** BASIC DARAHETERS YIELDS - TOTAL (FISSION) HEIGHT OR DEPTH OF 9UPST ALTITUDE OF 67 SOIL CATEGORY

FEET; RELATIVE TO GZ

AVERAGE GAS TEMPERATURE

AVERAGE GAS TEMPERATURE

AVERAGE TEMPERATURE

B. KT.LOSTAMS

SCALED HIGHTS OF BURST HATERIAL IN CLOUN

C. KT.LOSTAMS

SCALED HIGHTS OF BURST HATERIAL IN CLOUN

FRACTION OF THE TOTAL SYDDON WHERSY IN THE LLCHIN AT THE INITIAL TIME = .4rdd

FRACTION OF THIS EMERGY USED TO HEAT A AND SCALE = .6rdd

FRACTION USED TO HEAT LIQUID HATER = .2203.000 (K)

PALLOUT SOLITIFICATION TEMPERATURE = .2203.000 (K)

PETONATION COURTINES

TALLOUT SOLITIFICATION TEMPERATURE = .2203.000 (K)

METERS)

***M/9X 78+843

FALLOUT PAPTIBLE BENSITY

	PARTICLE SI A LOG-1 H H F F F F F F F F F F F F F F F F F	ZE FREQUENCY DISTRIBUTION NORMAL DISTRIBUTION SECTOR DIAMETER CONTROL STANDARD SPECIFICATION MAS SP	IBUTION N HITH - DEVIATION EPIFIED BY	. LC70CF+3P . 400CUE+01 THF PKOGK-X	MICROMETERS
	PARTICLE VO	LUME FOE LUENCY DIS NORMAL DISTRIBUTID EDIAN DIAMETER FOMETRIC STANDAPO	TREBUTION N WITH - DEVIATION	.12956E+.7	*ICRCYETERS
PARFICLE NJHBER OF	SIZE - MASS F PARTICLE SI	SISTOIBUTION TABLE ZE CLASSES = TC	CITAYETERS	ARC IN WETERS)	
	DIAMTTER	LOMER BOUNCRY	FRACTT IN	USPER ACUNGARY	
Ŧ	4836E-1	65±+£-1	0-325-4	1E-1	
101	311	409E+	3335-	1	
٠,	93915-3	767565-53	0	0 - 36 0	
± u	8193E-0	595735-15	> c	10111111111	
n vo	54995-3	6.35 c 5.3		0-36.75	
۰,	38534E-	35611E 3	c	416952-0	
ຍ ປ	31165-8	78+ E-+3	S	11E-0	
m	6751c-1	8525-33	٠,	3-348	
6.3 ·	. 251635-33		.333335-01	26 F 5 7 E - C	
#	221545-6	268137-53	c,	7024 TELE	
Z F	195415-6	10 0 0 1 1 1 0 0 1 1 1 0 0 1 1 1 1 1 1	3 C	0 1 1 1 1 1 1	
0 d	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	50-1100 1100 1100 1100 1100 1100 1100 11	ے د	TI.	
15	137605-3	129805-15		5735-0	
911	12257=-3	115585-03	0	0-1	
17	10913 =- C	102955-63	0	E - 0	
97	70315-0	#3-135#	0	į.	
6	60852-0	10-36-0	•	100	
5 7	6126 =-0	F Zu E - C4	P 6	61.57.47.1.5 44.70.17.47.1.5	
- 1 5		6 28 J 7 E - C 4	, c	7 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	
u #		4.1.001.4.	. 0	9	
1. 1. c	3757	10-724	L	0-3-5227	
. 22	37067E-0	73959E-04		3-347777	
9.7	307535-4	27842	P3332F-0	0-369:	
2.2	+247325-5+	215096-0	3332-0	842三-9	
2. §	8865c+J	262F-	7	695	
er.	128635-	132125-0	3335-0	F202E-6	
co No	679235-0	451768-0	1335-0	213E-0	
	6				
	20.00	VISION PARAMETERS	- N - HI NI V	TITEAL (VOI) =	80
		25007 30	THE PROPER NO	C C C C C C C C C C C C C C C C C C C	•
	'n	74 IN071 ×		- (J#X.)	

ATHOSPHERE IDENTIFICATION - TEST PROBLE4 ATHOSPHORE

AT M3SPHERE

BTE OHE	9825+81 •1 5535+81 •1	* 62E+r1 .17412E-E	121E+f1 .17396E-f	1965541 .17233E-[F53E+03 .17345E-0	4445+GC .16858E-P	973E+0m .1675CE-C	397E+6@ .16642E-0	*74E+6" .16534E-0	752E+43 .16425E-[04.164PP .1621E-C	-85E+00 -15644E-0	231E+0r .15477E-0	£29E+0r .15407E-0	427E+07 .15137E-0	.26E+FC .14866F-0	124E+0g .14603E-0	723E+8C .14342E-C	565E+fg .14145E-6	779E+PC .14081E-0	*n2E+rf .14C29E-@	3-346346 . 143846-8		J-345+10 . 14178F-C	:015+70 .14187E-0	170E+0C .14197E-0	24vE+03 .14206F-6	389E+6" ,1421 EE-E	188E+P3 .14216E-P	707±+00 .14216E-0	4855+8F 3.14216E-C	231E+ru .14217E-6	305E+00 .14217E-0	405E-C1 .14217E-C	554E-01 .14217E+0	+83E-61 .14-09E-6		319F-P1 .14185E-0	5*7F-61 .14173E-E	5555-*1 .14151E-0	246E-01 .14159z-0	762E-01 .14217E-0
3LH	.77 GGGE+B2 .12	3295E+02 .1	507RE+u2 .4	16685+12	€* 20+3823h	7447E+62 .9	44612+02 .8	1505E+02 .8	87686+32 .7	52625+02 .7	8608E+02	9651E+62 .6	2453E+32 .5	75=95+52 .5	26255+12	5911E+01 .4	187055+41 .4	10545+30 .+	135565+46 .3	69767E-01 .	7.22E-02 .7	627395-12 .2	84555-32 .2	1797E-u?	3199E-13 .2	66 E2E-13 . 2	10 20-2+03+	446F7E-B4	4439E-34 .1	3,099≅-85	£125-95 .	34745-36 .1	\$288E-06 .1	31,25-76 .9	831 EE-07 .8	. 71512 ·	152+6E-07 .7	11272E-07 .6	72583E-05	332465-38	4. 60-358	74855-33
S cc	.10287E+G5	513E+6	9997+1	7315+4	3+25+6	95 2E + 0	275E+0	59 3E+0	322E+6	2+55+5	2115+0	+38E+0	7365+6	717E+0	24.36.40	333E+0	28832E+3	243E+G	23923E+0	752E+0	7555+€	160755+1	39+E+u	3795+1	592E+0	535543	51.98+3	1335+1	245E+6	15+E+u	38+E+G	731E+1	33+6+0	82552+1	25385+0	+	4377E+C	P533F+3	6843E+B	37135E+0	. 25347E+64	7477=+0
ATP	.292055+03	295+3	27793E+0	+62E+0	27085E+C	767E+ 0	26493E+3	2785+	260635+3	25849E+0	+32E+0	314E+3	2+3 96 5+2	23 887 E+ A	23377E+0	22868E+3	378E+?	21897E+1	21610E+0	21420E+J	326£+4	21425E+3	21524E+9	21596E+j	21613E+P	5305+0	547547	2664c+3	365E+0	565E+0	215665+0	966E+0	666 E+0	566E+L	21666E+3	21651E+û	21630E+	216 B8E+C	21586E+3	215645+0	21579E+	21 667c+
ALT	60001≝+13 G.	. 64.00JE+3	12003 5+3	8043 5+3	2-060 5+3	D+II nun C	36000 E+0	42003+3	4.8063 =+3	0+1000t	66000 5+3	660035+3	723095+0	786415+1	4672840	r+Ergan6	966432+3	1 U 203 =+6	158032+3	11403 E+	120612+0	126635+3	132632+0	13863 E+u	14404243	15 343 5+2	156035+1	15203 E+5	68032+3	7463 5+3	18 GD6 E+ C	8643 €+3	9203 E+3	9863E+3	22467 =+3	1633 = +0	216632+)	2200E+0	281354	3403=+0		4-6834

HOT-TIME MING DATA

	٨	6.12636E+06	1.178262+01	4.924345+86	1.4C954E+01	1.55639E+01	1.22567E+01	9.41367E+00	9.95658E+#1	6.88232E+00	3.47818E+00	-6.16636E-01	-6.15[9GE-01	-1.91C13E+0C	1.37438E-08	-2.17889E+GE
CRUCESSED DATA	×	-6-142765+63	-8.49enac+6-	8.58241E-01	5.136302+93	1.089365+01	1.828467+01	9-469345+30	8.356245+56	5.82582*+30	8.457235+00	6.973365+60	6.977362+40	1.583295+11	1.100965+01	2.400495+91
	V.	2.10779E+12	t.54301E+13	3.027935+33	5.533" 35+95	7.3273JE+93	3, 3393 35+33	7-04-38 1=+14	1.1887 35+74	1.369935+14	1.6267 15+14	1.455263E+14	2,05653E+14	2.7092 15+14	2.54971E+14	3-142375+34
	VY OR SPEED	8.J0303F+49	1.30-0;5+01	5.10376+00	1.500016+01	1. 3. 953E+01	1.507798+01	1.13363E+01	1.303305+31	1.200005+01	9.301015+24	7.103035+00	7.104115+86	1.1003JE+01	1,137032+01	2.564115+01
RAM DATE	VX OR SIE.	1.40000+62	1,55000E+64	1.936665+52	2.000000±+02	2.1500 JE+E2	2,200000±+02	2,156665+52	2,206005+02	2.350mGE+02	2.500005+22	2.750605+32	2.7500051.2	2.850005+02	2.700005+42	2.75000E+12
	2	2.160000€+12	1.5460.5+03	3.397005+03	5.688332+33	7.3270EE+13	9.309f1E+13	1.04683 2+34	1.18873 =+34	1.3698uE+14	1.62670E+84	1.852032+34	2.0665, 2+3+	2.39029E+54	2.64933 5+34	3.16230 =+14

CLOUD AISF IS TEPMINATED IN CXPN AT STATEMENT 443 BY THE U, EK SWITCH

1688E+62 1766E+62 2485E+62 2595E+62 1516E+02 1618E+02 1618E+ .9056642 .9056642 .9056642 .9056642 .9056642 .90576642 .90576462 .5057646 .5057646 .5057646 .5057646 .5057646 .5057646 .5057646 .505764 .50576 72650+93 7429516+133 981316+133 111706+033 111706+034 115966+04 2265761 21649 27059 31051 31051 4737 4737 4737 4737 4745 4755 47 4375E+60 -8775E+60 -8775E+60 -8756E+60 -

1323E+00 1323E+00 2053E+00 2770E+00 5739E+00 5739E+00 6646E+00 6646E+00 68135E+00 68135E+00 7711E+00 7755E+00 7771E+00 7771

TEMPER! TURE

£

RACIAL PATE (M/SEC)

DELFIC TEST POCPLEM

AND GROWTH HISTGAY FOR BUN

OUD RISE

CLOUD HISTORY TARLE

CLOUD RAJIUS (M)

CLOUP TOP (%)

CLOJN BASE C4

CLOUD INTERVAL (SEC)

SLOUD TÍME (SEC) .5917E+00 .5849E+00 .5815E+00 .5815E+00 .5803E+00

TIME OF SOIL SOLIDIFICATION AT TEMPERATURE 2230.001): UFG. In 5.6292 SEC.

经存储的 医甲状腺素

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DIFFUSIVE TOANSOORT MONULE

PREPARED BY ATHOSPHERIC SCIENCE ASCULLATES REDFORT, MASS. ***** SUMMARY OF RUN INENTFIEDS *****
INITIALIZATION AND SLOWY PISE MODULE IDENTIFICATION - DELFIC FEST PROBLEM - ICRM
DIFFUSIVE FRANSORFT MOUULE IDENTIFICATION - DELFIC FEST PROBLEM - DTM

THE CONTROL VARIABLE ARPAY, MC(J), HAS BEEN GIVEN THE VALUES -

.1396C=+17) (HETERS) THE TRANSPORT TIME LIMIT IS 172000.JOU SFC. (48.00000 HOURS) COORDINATES OF SROWN ZEPO (KGZ, VSZ, ZGZ) ARE (0. , ?.,) ... SECONDS DETONATION TIME IS 0.

-. 50 000E+10) -JORIZONTAL COOFCINATES OF THE SOUTH WEST CORNER OF THE TRANSPORT SPACE ARE (-. SCCCOSTAID)
THE RESOLUTION NET SPACING IS .IORCEFALL (ALL IN METERS)
A PLANE DEPOSITION SUPFACE AT ALTITUDE .1:9.;10 (METERS AROVE MSL) IS ASSUMED

30 PARTICLE SIZE CLASSES 3aV La3Hi FALLOJT PARTICLE DENSITY IS .250062+04 KG/34+3

TRANSPORT IS BY THE GULCK HETHOD

G.COG HOUPS)
0.00
کدن (
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THEN
TIMES LATER THEN
Sanii
1 FOE
UPDATE
THOSPHERE

	RAM SING DATA		۵	PROCESSED WIND DATA	JATA
2	WE OF TIR.	WY OR SPIED	N	×	ζ,
2.1.0002:+02	1.408025+62	8.3243CE+66	2.168815+12	-5-1423CE+05	6.12a36E+60
1.548/02133	1.5000E+02	1,30000E+61	1.5443 15 +93	での+ュカごカンサでゴー	1.17820E+01
5.0.970vm.03	1.90 100E+02	5.31.303E+30	5.197115+13	8.682415-11	4,927.845466
5.15830,1,+33	2.00.000E+82	4.50000E+01	5.548135+13	5.17.3cE+36	1.46954E+01
7.22.703.6433	2,159E0E+02	1.300075+01	7,3273 JF+13	1.1P995==+61	1.55639E+01
9+54512E+33	5.20:00E+02	1.5000E+01	9.169915+13	1.028465+31	1.22567E+01
1.848012+14	1-15000E+02	1.100005+61	1.1488 16+34	6.379345+03	9.01C67E+00
1.1887. =+34	6.23000E+32	1, 30390E+01	1-1837 6-+74	3.356245+63	3.95858E+00
1.3595; 5+1+	2.350005+32	1.2C.83E+01	1.36983 - +34	9.829825+50	6.88292E+10
464372539*1	2.50000E+u2	9.0633CE+C6	1.5267 15+14	9.4F723E+PB	3.67818E+08
1.85203E+0+	2.750005+32	7.300005+60	1.452612+34	6.973365+00	-6.1CE3CE-01
2.066565114	2.7500 GE+G2	7.30040E+00	2, 1565 15+14	6.9737FE+0G	-6.10E9UE-01
2,39022=+34	2.600005+32	1.1(33.E+01	2.393235+34	1.683295+*1	-1.91013E+00
2,6493) 5+14	2.730005+32	1.109305+91	2.649735+74	1.19-200-12	1.97438E-08
マッキ コンスカニナロル	0 750000400	AL AUTORITY C	7. 18773551	2 C CO 1. CH 404	-2 47 BBGEARA

ATNO LAYER GASE ALTITUDES

LEVELS LEVELS

MAXIMUM AIND SPADE ALTITUDE IS .327.1c+u5 METERS

ATMOSPHERE UPDA-E 3 FOR TIMES LATER THAN S. SEC (G.GLG HOURS)
A F F F F F F F TURBULENCE DATA F F F F F F F F

TURBULENCE PAPAMETEDS ARE CALCULATED BY WILKINS PECIPPOCAL ALTITUDE FUNCTION FOR UPDATE 1 AT 1.

12925-0 116325-0 11625-0 11655-0 17355-0	443000000000000000000000000000000000000
0xSUH 89615-3 129615-3 61426-3 44645-3 17365-3 27155-3	3 4 4 5 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
20H 20H 30H 30H 30H 30H 30H 30H 30H 30H 30H 3	6625 E + + + + + + + + + + + + + + + + + +
አዛሪክብክወ	- ^{9 6} 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7

TURBULENCE PARAHETER AVERAGED OVER ALL SPACE FOR UPDATE 1 IS \$5708JE+0F

THE PERSON NAMED IN

DEPARTMENT OF BEFENSE FALLOUIT OFFILE

(I) T

F BEFENSE FALLOUT PPEDICTION SYSTEM

OUTPUT PRICESSOF MODULE

PEDAREN BY ATMOSPHERIC SCIENCE ASSOCIATES BEDFORD, MASS.

errak foyo bili

**** SJHHARY OF RUN INFNIEISPR ****
CUTFUI PROCESSOR - OFFECTERSI PROBLEM - OPH
INITIALIZATION AND CLOUD RISE - OELFIC TEST PROBLEM - ICRH
CIFFUSIVE FRANSPORT - DELFIC TEST PROBLEM - PTH

**** THE CONTROL WARTAGLE ARRAY, LOCU), WAS GIVEN THE FOLLOWING VALUES ****

TOTAL YIELD IS 5.1000E+01 KILOTONS. FISSION YIELD IS 5.00043+01 KILOTONS.

TYPE OF FISSIAM IS 0239ME

THE HEISHT OF NUTST IS G. FOR METERS.

SOIL INJURED ACTIVITY - MEUTRONS CHITTED HED FISSION ARE 1.460

THE CLOUD PEACHED THE SOIL CONDENSATION TEMPERATURE OF 2200. L AT 5.0232 PEC.

THERE ARE 31 PARTICLE DLASSES

PRINTER DESCRIPTION - CHARACTECS OFR INCH HGPIZONIAL 10 VERTICAL 6

**** OUTPUT PROCESSOR TASK 1 ****

	1.3.e ALTITUDE OF GZ 179.COO METERS ABOVE MSL	
DELEA Y 1530.6°	TITUDE OF GZ	
0564 X 1800-86		REINTED ABOVE
**************************************	SPO 4SE FACTOR	IN INCREMENTS
NIEL	INSTRUMENT RE	ICET BY THE 69.
GRID LIMITS AND ANTERVALS KMIN -9000. LE+27.	COMBINED GPOUND ROJEHNESS-INSTRUMENT RESPONSE FACTOR	UNDISTORTED MAPS ARE PROBUCET BY THE GOID INCREMENTS FRINTED ABOVE

REQUEST NUMBER 1						
HAP TYPE 2	# #	ر. دو	4 51 11	3.63	MASCHN =	C 1
QCUT= .105±3E=f3		CUTHAD=	CUTHAP= .15330=f1			

	FP 1.2379E+10 1.3280E+10 1.4506E+10 1.9716E+10 2.8264E+10 0.
	PSIZE 3.7667E-F5 1.2379E+18 2.6753E-F5 1.3286F11 1.8666E-F5 1.9716E+11 1.2863E-F5 1.9716E+11 6.7523E-F6 2.8264E+11 0.0000000000000000000000000000000000
LE SIZE CLASS	F2 9.0129F+09 9.2673E+09 9.6497E+09 9.6640E+09 1.020E+16 1.106E+10 1.11677E+10
IN EACH PARTI	PSITE 1.10111-[4 3.7312E-FF 3.6735F-FF 5.7026-ES 5.8559E-FS 5.1936-GF 6.37677-B5
TABLE OF TOTAL ACTIVITY IN EACH PARTICLE SIZE CLASS	7.5157E+09 1.1013E-04 7.5715E+09 3.6785E-09 6.0116E+19 3.6785E-09 6.1579E+19 5.105E-05 6.152E+19 5.1056-05 8.3552E+19 5.1056-05 8.779E+19 5.1056-05 8.779E+19 1.37677-05
TABLE OF T	
	PSIZE 2,4831E-13 6,187E+39 2,6751E-14 1,3111E-13 6,3763E+39 2,5163E-14 0,9391E-14 6,5862E+69 2,215+E-14 0,8191E-14 6,75462+19 1,0951E-14 4,5493E-14 7,1648E+19 1,545E-14 3,8534E-14 7,21422+39 1,2751E-14 3,3111E-14 7,3538E+39 1,2257E-14 K FACTORS CAMPUTED FROM THE F7 TABLE -
	PSIZE 2.4831E-13 4.9391E-13 6.8190E-14 5.4839E-14 4.5499E-14 3.3111E-14 X.FACIORS COM

THIS MAP USES THE THO-LINE E FORMAT

THE QUANTITY PRESENTED IS TYPOSHOP. TYPOSHOP RATE NORMLIZED TO TIME 4+1 HOUP. UNITS ARE ROENTGENS DER HOUR GROUND ZERO IS LOCATED AT X = G.O.D., Y = C.O.

STRIP 1	+	DELFIC	TEST PROBLE	1	79.4							HAP T	TYPE 2		
*	•	-7739.	-36uk	ر د. •	;	10	368B.	7248.		13801.	1445	;	180,3.	21603.	
	51444	1.326	1 4.154	1 4, 615	1 5,722 7,117	17 6, 181	10 10 10 10 10 10 10 10 10 10 10 10 10 1	7.581 3.	3.725 7.4	. 3 . 5 . 77e	-1	6 6. £3 G			
	49503.	1.148	2.39F	5. 5. 5. 5.	1 6.141 7.272	1 72 9, 714	2 1.745	4 C87.	1 3,214 6,687	ن • وو7	-1	6 6.c66			
	43643.	4.587	4 to 654	4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	1 6.53 7.7*9	450 41 PA	61 Fd	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	3.619 5.522	£ • 439	-1.	6.63.3			
	46561.	3.115	는 다 다 다	7,753	1 5,986 8,322	22 1. 195	2 1.14	7,660 2.0	2 2.685 4.33 <u>0</u>	f 334 • 299	6 0 - til	c 60 .3			
	45 643 •	2,769	1. 5.465	1 5.22,	1 0.564 6.657	57 1.149	2.157	1 1 7,314 2.	1 2,339 7,397	• 209	າ ວີ ລີ	e c• 60 a			
	43593.	ë 2•+54	1.625	1 6.331	1 7.583 9.177	77 1.203	2 1.18	7.044 2.	1 2.098 2.7	.152	0.20	6 i. 83 G			
	42030.	3.495	1 3.142	1 8.11	1 5.16+ 3.536	26 1, 254	2.22.1	1 1 1 5.0 °C	1 1.91* 2.278	. 163		6 i. t33			
	46343.	3.328	1 2,232	2.177	1 7,906 1,127	2 2 229	1.253	1 6.729 1.	1 1.684 1.757	-1	982*1	ក ភូ- ចំប់ព្			
	39003.	1.411	1 2•74§	1.9.732	1 3.4Ci i.78?	2 87 1.392	17 17 17 17 17	1 6,736 1,0	1 1.421 1.345	1 •463	ר-פתנה ו ב	0 • 5 d G			
	375:1.	. 629	1 3.936 5	1 5.42+	2 £ 1.128	2 28 1.454	2 1.732	4 C C C C C C C C C C C C C C C C C C C	1.251	-1.	0 0 • 666	e 0• 80 J			
	35 6. 3.	9 004°	1 4.635	4 2 4 4 4 4 4 4 4 4	2 2 1.12: 1.150	2 1.513	2 - 284	5.531 1.	1.232 .7	.75E .262		e 3. ca g			
	34558.	5+4.	1.07=	2 1.453 1.	2 1.0c1 1.c95	2 1,575	7. 14. 23. 43. 43. 43. 43. 43. 43. 43. 43. 43. 4	1 5.17= 8.0	5 809° 8	-i -555 •124		0 G• 63 G			
	33401.	154.	1. 1.150	2 1.193 1.	2 1,232 1,387	2 1, 636	1.275	1 4.716 7.	0 7*** 6	000°9 562°	6.960	6 0.6.3			
	31533.	6. 187	1.572	ĭ 7. 5++	2 2,535 1,464	64 1. 585 64 1. 585	1.245	1 4, 229 5.	_	3 • 283 • • 880	ני נינו	£30			
	33663.	-1 -912	1 4. F17	2 2 2 1.1.1.	2 1.577 1.590	2 1.73C	2.212	3.792 4.	0 0 0 0 0 0	300°7 EEI•	199*3	e 			
	2.5.1.	-1	1.2.351	2 2 1.611 1.	2 2 2 1.722	22 4.761	2.17?	1 3.3 ⁷⁵).	0 3•559 •£	790°0 527°		f 0.63.9			
	27 - 13.	111. 111.	n 4.776	4.00.8 5.00.8	2 2 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	27 ± 62F	12 14 16 33	1 6 2, 63 2, 6	6 -1 2.6 ^e c .8	006.3 578.	r u.68¢	6 6.00			
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-7230		-3663			•	35	3693.	121	7274.	13866.	2	14406.	16.	18900

. c855382+65 CUM OF MAP ORDINATES = OUTPUT PROCESSING IS COMPLETED.

25200. **

21600.

5. FORTRAN CODE LISTINGS

```
TRPL
*DECK, TRPL
                                                                                    1
                                                                            TRFL
      SUBROUTINE TRPL (
                                                                            TRPL
     1 ARG, NPR, PARA, PARB, VRB)
                                                                            TRPL
                                                                            FRPL
                                                                            TRPL
      TRPL USES LINEAR INTERPOLATION TO LOCATE POSITION OF ARG WITHIN
                                                                            TRPL
C
      THE ONE-DIMENSIONAL ARRAY PARA AND COMPUTES FOR THE CORRESPONDING TRPL
C
      POSITION IN THE ONE-DIMENSIONAL ARRAY PARB, VKB. NPK IS THE
                                                                            TRPL
ε
      DIMENSION OF PARA AND PARB (WHOSE ELEMENTS CORRESPOND ONE TO ONE). TRPL
C
                                                                            TRPL
                                                                                   11
      IF ARG IS OUTSIDE THE TABULATED VALUES OF PARA, VRB IS SELECTED
                                                                             TRPL
      FROM THE CORRESPONCING END OF PAR8.
                                                                                   12
                                                                             TRPL
      PARA IS ORDERED FROM LEAST (PARA (1)) TO GREATEST (PARA (NPR))
                                                                                   13
                                                                            TRPL
                                                                                   14
                                                                            FTRPL
                                                                                   15
C
С
                                                                             TRPL
                                                                                   16
                                                                             TRPL
      DIMENSION
                                                                                   17
                                                                             TRPL
                                                                                   18
     1 PARA ( NPR), PARB (NPR)
                                                                             TRPL
                                                                                   19
                                                                           **TRPL
                                                                             TRPL
                                                                                   22
C
                                                                             TRPL
                                                                                   23
  G20 IF (ARG - PARA (1)) 022, 022, 040
                                                                             TRPL
                                                                                   24
  022 MB = 1
                                                                             TRPL
                                                                                   25
  £24 VRB = PARB (MB)
                                                                             TRPL
  L26 RETURN
                                                                             TRPL
                                                                                   7ے
  640 DO 054 MA =2, NPR
                                                                             TRPL
      IF (ARG - PARA (MA)) 048, 044, 054
                                                                                   28
                                                                             TRPL
                                                                                   29
  £44 MB = N1
                                                                             TRPL
                                                                                   30
      GO TO 324
  048 \text{ VRB} = (ARG - PARA (MA - 1)) + (PARB (MA) - PARB (MA - 1)) /
                                                                             TRPL
                                                                                   31
     1 (PARA (MA) - PARA (MA - 1)) + PARB (MA - 1)
                                                                             TRPL
                                                                             TRPL.
                                                                                   33
      GO TO 026
                                                                             TRPL
                                                                                   34
  154 CONTINUE
                                                                             TRPL
                                                                                   35
      MB = NPR
                                                                             TRPL
                                                                                   36
      GO TO 024
                                                                             TRPL
                                                                                   37
      END
```

C C	DECK, ERROR SUBROUTINE ERROR (PROGRM, IRROR, ISOUT) T. W. SCHWENKE 1 MARCH 1966	ERROR ERROR ERROR	1 2 3 4
C	************		
0000	THIS PROGRAM WRITES A GENERALIZED ERROR COMMENT OF THE FOLLOWING FORM ON TAPE ISOUT AND THEN RETURNS IF THE SIGN OF IRRUR IS POSITIVE OR STOPS IF ITS SIGN IS NEGATIVE.	ERROR ERROR ERROR ERROR ERROR	8 9 10
0 0 0	ERROR SENSED IN FROGRAM (PROGRM) AT CR NEAR STATEMENT NUMBER (IRROR). PLEASE REFER TO THE PROGRAM LISTING.		12 13
000	PRIOR TO CALLING ERRCR THE PARAMETER PROGRM MUST BE SET WITH THE BCD NAME OF THE CALLING	ERROR ERKOR	15 16
000	PROGRAM AND PARAMETER IRROR MUST BE SET WITH THE NUMBER OF THE FORTRAN STATEMENT WHICH BEST IDENTIFIES THE ERROR CONDITION.	ERROR ERROR	18 19
C 1	######################################	ERROR TERROR	2 1 2 2 2 3
C C C	香水质的 食物性 解析 50 克克斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯	*ERROR *ERROR ERROR	25 26 27
	IRR= IABS(IRROR) WRITE(ISOUT,1)PROGRM,IRR IF(IRROR)101,100,100 100 RETURN 101 STOP END	ERROR ERROR ERROR ERROR ERROR	29 30 31 32

```
*DECK, SETTLE
                                                                             SETTL
      SUBROUTINE SETTLE(0,RHOP,RHO,ETA,T,P,V,I)
                                                                             SETTL
                                                                             SETTL
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                             SETTL
                                                                             SETTL
      COMPUTES STILL-AIR SETTLING SPEED OF RIGID SPHERES ACCORDING TO THE EQUATIONS OF BEARD (JAS33,852(1976)) FOR SMALL SPHERES
                                                                             SETTL
                                                                                     6
                                                                             SETTL
      (CDRR .LE. 84.175); AND DAVIES(PROC.PHYS.SOC.(LCNDON)57,256(1945)) SETTL
      FOR LARGER SPHERES.
                                                                             SETTL
                                                                             SETTL 10
      GLOSSARY (SI UNITS)
                                                                             SETTL 11
C
               4.0+G/3.0
                           WHERE G IS ACCELERATION OF GRAVITY (9.8)
                                                                             SETTL 12
C
      CORR
               DAVIES NUMBER
                                                                             SETTL 13
               TPHERE DIAMETER
C
      n
                                                                             SETTL 14
C
      ETA
               VISCOSITY
                                                                              SETTL 15
С
               PRESSURE
                                                                             SETTL 16
               FLUID DENSITY
C
      RHO
                                                                             SETTL 17
               SPHERE DENSITY
      RHOP
                                                                             SETTL 18
C
      ۳
               TEMPERATURE
                                                                             SETTL 19
               SETTLING SPEED
C
                                                                             SETTL 20
               ACCURACY INDICATOR
                                                                             SETTL 21
C
               I = 0 RESULT IS ACCURATE
                                                                             SETTL 22
               I = 1 RESULT IS INAGCURATE, DAVIES NUMBER IS TOO LARGE
C
                                                                             SETTL 23
                                                                             SETTL 24
      DATA C/13.066667/
                                                                             SETTL 25
C
                                                                             SETTL 26
      I = 1
                                                                             SETTL 27
COMPUTE DAVIES NUMBER
                                                                             SETTL 28
      CDRR = C*(RHOP-RHO)*RHO*C*+3/ETA**2
                                                                             SETTL 29
CHECK DAVIES NUMBER VALUE FOR ROUTING
                                                                             SETTL 30
      IF(CDRR.GT. 0.3261) IF(CDRR-84.175) 1(0,100.200
                                                                             SETTL 31
COMPUTE VIA STOKES-LAW EQUATION
                                                                             SETTL 32
      V = CDRR*ETA/(24.0*RHO*D)
                                                                             SETTL 33
      GO TO 539
                                                                             SETTL 34
COMPUTE VIA BEARDS EQUATION
                                                                             SETTL 35
      Y = ALOG(CORR)
                                                                             SETTL 36
      V = ETA/(RHO+D)+EXP(-3.18657 + Y+(0.992696 + Y+(-0.153193E-2))
                                                                             SETTL 37
     1+Y*(-0.987059E-3 + Y*(-0.578878E-3 + Y*(0.855176E-4
                                                                             SETTL 38
     2-Y+0.327615E-5)))))
                                                                             SETTL 39
      GO TO 500
                                                                             SETTL 40
CUMPUTE VIA DAVIES EQUATIONS
                                                                             SETTL 41
     IF(CDRR.GT.140.) IF(CDRR-4.5E7) 400,400,300
                                                                             SETTL 42
      V = ETA/(RHO*D)*CORR*(4.16666667E-2 + CDRR*(-2.3363E-4
                                                                             SETTL 43
     1+CORR+(2.0154E-6-CDRR+6.9105E-9)))
                                                                             SETTL 44
      GO TO 500
                                                                              SETTL 45
 300
      I = 1
                                                                             SETTL 46
      Y = ALOGIU(CORR)
 400
                                                                             SETTL 47
      V = ETA/(RHO+D)+(10.0)++(-1.29536 + Y+(0.986 + Y+(-0.046677+
                                                                             SETTL 48
     1Y*1.1235E-3)))
                                                                             SETTL 49
      RETURN
                                                                              SETTL 50
CORRECT SETTLING SPEED FOR SLIP
                                                                             SETTL 51
      V = V^{*}(1.0 + 54.088 + ETA + SQRT(T) / F/D)
                                                                             SETTL 52
                                                                              SETTL 53
      RETURN
      END
                                                                             SETTL 54
```

```
*DECK, ICRMEX
                                                                          ICRME
      SUBROUTINE ICRMEX (NUMTAP)
                                                                          ICRME
                                                                                 2
                                                                          ICRME
C
      H. G. NORMENT. ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1976
                                                                          ICRME
                                                                          ICRME
                                                                                 5
C
                                                                       *** ICRME
C
                                                                          ICRME
                   INITIALIZATION AND CLOUD RISE MODULE
                                                                          ICRME
                                                                                 q
C
                                                                          ICRME
C
      DETERMINES INITIAL VALUES OF -
                                                                          ICRME 10
      TIME, TEMPERATURE, TCTAL SOIL MASS, FRACTION OF THE SOIL BURDEN INICRME
                                                                                11
      THE VAPOR PHASE, AND THE SIZE FREQUENCY DISTRIBUTION OF THE
C
                                                                          ICRME 12
      FALLOUT PARTICLES. NEXT IT PERFORMS A DYNAMIC CLOUD RISE AND
                                                                          ICRME 13
C
      STABILIZATION SIMULATION. THEN IT ESTABLISHES AN
                                                                          ICRME 14
      AXISYMMETRIC DISTRIBUTION OF FALLOUT PARCELS ABOVE GZ.
                                                                 FINALLY
                                                                          IORME 15
      THE COORDINATES OF THESE PARCELS ARE ADJUSTED TO ACCOUNT FOR
                                                                          ICRME 16
      WIND TRANSPORT DURING THE PERIOD OF CLOUD RISE AND STABILIZATION
                                                                          ICRME 17
С
      AND A TRANSLATION OF THE COCRDINATES OF GZ AND CETONATION TIME.
                                                                          ICRME 18
                                                                          ICRME 19
                              GLOSSARY ***********
                                                                          FICRNE 20
                                                                          ICRME 21
           ARRAY(256), ATMOSPHERE ALTITUDE IN METERS(MSL) CORRESPONDINGIORME 22
   ALT
            TO ATP, PRS, RLH, RHO, ETA
                                                                          ICRME 23
   ATMR
            SUBROUTINE, READS IN TAGLES OF ALT, ATP, PAS, RLH, RHO, ETA
                                                                          ICRME 24
          - ARRAY(12), 72 ALPHANUMERIC CHARACTERS FOR ATMOSPHERE IDENT. ICRME 25
C
   ATID
C
   ATP
          - ARRAY (256), AT POSPHERE TEMPERATURE (K) MATCHES ALT
                                                                          ICRME 26
C
   BARMU
           MEDIAN DIAMETER OF THE LUGNORMAL PARTICLE SIZE VS. VOLUME
                                                                          IORME 27
            DISTRIBUTION (FICROMETERS)
                                                                          ICRME 28
   82
          - DEPOSIT INCREMENT LINEAR DIMENSION(CX(5, MCX)/IRAD)
                                                                          ICRME 29
C
C
   CAYM
             K-TO-MASS RATIO PARAMETER OF THE FOHER-LAW PARTICLE DISTBN.1CRME 30
          - ARRAY(200), FALLING SPEEDS OF PARTICLES IN THE CLOUD (M/SEC) ICRME 31
C
   CG
   CHANGE - CLOUD TIME AFTER WHICH STEP LENGTH CHANGES TO DST2
                                                                          ICRNE 32
   CL
          - LATENT HEAT OF VAPORIZATION OF WATER
                                                                          ICRME 33
С
   CMLR
          - CLOUD MASS LOSS RATE OF PARTICULATE FALLOUT
                                                                          ICRME 34
          - SPECIFIC HEAT OF AIR
                                                                          ICRME 35
С
   CP
   CPAI
            SPECIFIC HEAT OF AIR INTEGRATED FROM TE TO T
                                                                          ICRME 36
          - SUBROUTINE, COMPUTES PARTICLE FALLOUT RATE DURING CLOUD
                                                                          ICRNE 37
C
   CPFP
                                                                          ICRME 38
C
            RISE CALCULATIONS
            WEIGHTED AVERAGE SPECIFIC HEAT FOR AIR AND SOIL
   CR
                                                                          ICRME 39
          - SUBROUTINE, COMPUTES DYNAMIC CLOUD RISE AND EXPANSION
                                                                          TCRME 40
   CRMINT - SUBROUTINE, CCMPUTES INITIAL CRM VARIABLES
                                                                          ICRME 41
C
   CRITH
          - SUBROUTINE, PRINTS CRM OUTPUT
                                                                          ICRME 42
           ARRAY (50,13), CLOUD PROPERTIES VS. TIME COMPILED DURING CRM ICRME 43
C
   CX
            CALCULATIONS AND USED BY RSXP AND WNDSFT
                                                                          ICRME 44
C
            (J.1) - TIME(SEC) AFTER BURST
                                                                          ICRME 45
            (J,2) - CLOUD TIME INTERVAL(SEC) BEGINNING AT CX(J,1)
                                                                          ICRME 46
            (J,3) - CLOUD BASE(M) AT CX(J,1)
                                                                          ICRME 47
            (J,4) - CLOUD TOP(M) AT CX(J,1)
                                                                           ICRME 48
            (J,5) - CLOUD RADIUS(M) AT CX(J,1)
                                                                          ICRME 49
            (J,6) - CLOUD EASE RATE (M/SEC) DURING CX(J,2)
                                                                          ICRME 50
            (J,7) - CLOUD TOP RATE (M/SEC) DURING CX(J,2)
                                                                          ICRME 51
            (J.8) - CLOUD RADIAL RATE (M/SEC) DURING CX(J.2)
                                                                          ICRME 52
            (J.9) - CLOUD TEMPERATURE (K) AT CX(J.1)
                                                                          ICRME 53
            (J,10) - IN-CLCUD GAS DENSITY (KG/M**3) AT CX(J,1)
                                                                          ICRME 54
   CXPN
           SUBROUTINE, TABULATES CX ARRAY
                                                                          ICRME 55
C
            CONSTANT USED IN EDDY VISCOSITY MOMENTUM GENERATION
                                                                          ICRME 56
   C2
            (YIELD DEPENCENT)
                                                                           ICRME 57
   C3
            CONSTANT USED IN COMPUTING TURBULENT ENERGY DISSIPATION RATEICRME 56
          - CONSTANT USED IN COMPUTING AIR ENTRAINMENT RATE INTO CLOUD LICRME 59
            CAUSED BY WIND SHEAR
                                                                          ICRME 6U
```

```
DEK
          - DERIVATIVE OF EK
                                                                          ICRME 61
           MEDIAN DIAMETER (MICROMETERS) OF A LOGNORMAL PARTICLE
                                                                           ICRME 62
  DMEAN
                                                                           ICRME 63
            SISE DISTRIBUTION
          - SUBROUTINE, EVALUATES DERIVATIVES OF CLOUD PROPERTIES
                                                                           ICRME 64
  DERIV
          - ARRAY(12), 72 ALPHANUMERIC DETONATION IDENTIFICATION
   DETID
                                                                          1CRME 65
          - ARRAY(201), UPPER BOUNDARY OF I-TH PARTICLE SIZE CLASS.
                                                                          ICRME 66
C
   DIAM
            THE LAST ENTRY IN THE ARRAY IS THE LOWER BOUNDARY OF THE
                                                                           ICRME 67
            LAST (SMALLEST) PARTICLE SIZE CLASS. THE LENGTH OF THE DIAM
                                                                          ICRME 68
C
            ARRAY IS ALWAYS ONE GREATER THAN THE NUMBER OF SIZE CLASSES. ICRNE 69
                                                                           ICRME 70
¢
            (METERS)
C
   ONS
          - FALLOUT PARTICLE DENSITY (GM/CM**3), DEFAULT VALUE IS 2.6
                                                                           ICRME 71
                                                                           ICRME 72
           ARRAY (8,2),
   DPST
                            FALLOUT PARCEL VARIABLES COMPILED IN
            SUBROUTINE RSXP. THE SECOND INDEX IS NEEDED ONLY IN THE RSXPICRME 73
            CALCULATIONS TO DISTINGUISH THE PARCEL TOP FROM BASE
                                                                           ICRME 74
            (1,MBT) - TIME (SEC) OF ALTITUDE STABILIZATION OR GROUNDINGICRME 75
            (2.MBT) - ALTITUDE OF PARCEL
                                             CENTER OF MASS (METERS)
                                                                           ICRME 76
C
                                 RADIUS AT CENTER OF MASS (METERS)
            (3.MBT) - PARCEL
                                                                           ICRME 77
            (4,MOT) - MEAN PARTICLE DIAMETER (METERS)
                                                                           ICRME 78
            (5.MBT) - PAICEL MASS (KG) FOR A SIZE-MASS FRACTION PARTICLEICRME 79
                      DISTRIBUTION
                                                                           ICRME 80
                      PARCEL ACTIVITY FRACTION FOR A SIZE-ACTIVITY
                                                                           ICRME 81
                                                                           ICRME 62
                      FRACTION PARTICLE DISTRIBUTION
C
            (6.MBT) - PARCEL
                                 VERTICAL THICKNESS (METERS)
                                                                           ICRME 83
            (7, MBT) - ALTITUDE OF PARCEL BASE (METERS)
                                                                           ICRME
                                                                                 84
                                 VOLUME (CUBIC METERS)
                                                                           ICRME 85
            (8.MBT) - PARCEL
                                          PER PARTICLE SIZE CLASS
   DPSTK
           NUMBER OF
                       FALLOUT PARCELS
                                                                           ICRME
                                                                                 36
                                            RISE AND EXPANSION VARIABLE
                          FALLOUT PARCEL
                                                                          ICRME 97
C
   DPX
          - ARRAY (2,90),
                                                                           ICRME 88
            (1.J) - LIFT RATE FACTOR ABOVE CLOUD BASE (1/SEC)
Ç
            (2.J) - LIFT RATE FACTOR BELOW CLOUD BASE (1/SEC)
                                                                           ICRME 89
С
C
   DRM
           DERIVATIVE OF RM
                                                                           ICRME 90
                                                                           ICRME 91
C
   DS
          - DERIVATIVE OF S
   DST
          - INTEGRATION TIME STEP
                                                                           ICRME 92
                                                                           ICRML 93
C
   DSTO
          - INITIAL INTEGRATION TIME STEP
                                                                           ICRME 94
C
          - INTERMEDIATE INTEGRATION TIME STEP
   DST1
C
   DST2
          - FINAL VALUE OF INTEGRATION TIME STEP
                                                                           ICRME 95
                                                                           ICRME
                                                                                 96
C
   OT
            DERIVATIVE OF T
            DERIVATIVE OF L
                                                                           ICRME 97
C
   Dυ
                                                                           ICRME 98
            ARRAY(8), USED TO TRANSMIT VARIABLE DERIVATIVES TO REGILL
   DV3L
            DERIVATIVE OF WY
                                                                           ICRME 39
   DWT
            DERIVATIVE OF X
                                                                           ICRME1.J
С
   אם
            DERIVATIVE OF Z
                                                                           ICRME161
   OZ.
           EDDY VISCOSITY LOSS RATE OF KINETIC ENERGY OF RISE
                                                                           ICRME102
   ΕD
            TURBULENT KINETIC ENERGY DENSITY
                                                                           ICRME113
   EΚ
   EPS
            KINETIC ENERGY LOSS RATE
          - SUBROUTINE, FOR GENERAL UTILITY ERROR INDICATION
                                                                           ICRME105
   ERROR
          - SATURATION PRESSURE OF WATER VAPOR (INVALID FOR TEMPERATURE ICRME136
C
   ES
C
            ABOVE BOILING FOINT OF WATER)
                                                                           ICRME1:7
           ARRAY (256), ATMOSPHERIC DYNAMIC VISCOSITY (COEFF. OF VISC.) ICRME168
C
   ETA
            (KGM/(M-SEC)) PATCHES ALT ARRAY
                                                                           ICRME109
            IN SUBROUTINE RSXP, TIME INCREMENT BETWEEN WAFER HISTORY
                                                                           ICRME110
   EXTM
            DESCRIPTION POINTS
                                                                           ICRME111
C
            FRACTION OF W IN FIREBALL AT START OF RISE
                                                                           ICKME112
C
          - ARRAY(200), PARTICLE SIZE CLASS FRACTION OF TOTAL MASS OR
                                                                           ICRME113
   FMASS
                                                                           ICRME 114
            ACTIVITY LIFTED BY THE CLOUD
   FMT
          - OBJECT TIME FORMAT USED TO READ CATA
                                                                           ICRME115
C
          - DESIGNATES WHETHER WIND VELOCITIES ARE RESOLVED OR IN FOLAR TORME116
   FCRM
                                                                           ICRME117
             (METEOROLOGICAL CONVENTION) FORM
                                                                           ICRME 118
C
   FW
          - FISSION YIELD IN KILOTONS
                              FALLOUT PARCEL VARIABLES (OUTPUT OF RSXP) ICRME119
С
   GOPST
          - ARRAY(10,100),
                                       X COORDINATE (METERS)
                                                                           ICRME120
             (1,J) - FALLOUT PARCEL
```

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(2,J) - FALLOUT PARCEL
            (3.J) - TIME C(ORDINATE (SEC)
                                                                          ICRME122
            (4,J) - PARTICLE DIAMETER (METERS)
                                                                          1CRME123
            (5,J) - PARCEL MASS (KG) FOR A SIZE-MASS FRACTION PARTICLE
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                    DISTRIBUTION
                                                                          ICRME125
                    PARCEL ACTIVITY FRACTION FOR A SIZE-ACTIVITY
                                                                          ICRML126
                    FRACTION PARTICLE DISTRIBUTION
                                                                          ICRME127
                                               CENTER OF MASS (METERS)
            (6,J) - Z COCREINATE OF PARCEL
                                                                          ICRME128
            (7,J) - PARCEL
                              RADIUS AT CENTER OF MASS (METERS)
                                                                          ICRME129
            (8,J) - PARCEL
                              VERTICAL THICKNESS (METERS)
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            (13.J) - PARCEL
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                                                                          ICRME133
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C
                                                                          ICRME134
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                                                                          ICRME135
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                                                                          ICRME138
   IRISE
            ATHR AND FOR REXP OUTPUT
                                                                          ICRME139
                                                                          ICRME140
   ISIN
          - INPUT TAPE
   ISOUT
          - OUTPUT TAPE
                                                                          ICRME141
   JBASE
          - COMPUTED GO TO INDEX USED IN SUBROUTINE RSXP
                                                                          ICRME142
            1 - CONTINUE OPST TRAJECTORY COMPUTATION
                                                                          ICRME143
            2 - DPST TRAJECTORY COMPUTATION COMPLETE
                                                                          ICRME144
   JPARN
          - BINARY OUTPUT TAPE, SUBROUTINE WNDSFT
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   KBASE
          - COMPUTED GO TO INDEX USED IN SUBPOUTINE RSXP
                                                                          ICRME146
            1 - ADJUST DPST RADIUS AND ACTIVITY FOR LEAVING CLOUD
                                                                          ICRME147
            2 - ADJUSTMENT OF 1 HAS BEEN MADE
                                                                          LCRME148
   KCX
          - NUMBER OF DPST RISE AND EXPANSION INTERVALS
                                                                          ICRME149
          - NUMBER OF VERTICAL CLOUD SUBDIVISIONS FER PARTICLE SIZE CLASICRME150
   KDI
            IF NOT PUNCHEC, IT IS COMPUTED IN ICM
                                                                          ICRME151
            IN SUBROUTINE RSXP. NUMBER OF VERTICAL SUBCIVISIONS OF A
   KEIP
                                                                          10kME152
            PARCEL WHOSE TOP AND BASE RADII ARE NOT EQUAL
                                                                          ICRME153
   KDP ST
          - SEE DPSTK
                                                                          ICRME154
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                                                                          ICRME155
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            1 - PRESERVE VARIABLES AT START OF TIME STEP
                                                                          ICRME156
            2 - RESTORE VAFIABLES TO THOSE AT START OF TIME STEP
                                                                          ICRME157
   LODD
          - LENGTH OF FARCEL
                                DESCRIPTION DATA PLUCK (GDPST ARRAY IN
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                                                                          ICKME159
            R SXP)
          - IN SUBROUTINE RSXP. DISTINGUISHES A PARCEL TOP FROM BASE
C
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                                                                          ICRME160
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                                                                          ICRME161
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                                                                          ICRME162
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                                                                          ICRM±163
          - 1, INITIAL ENTRY INTO CXPN
                                                                          ICRME164
   MWY A
            2, REGULAR ENTRY
                                                                          ICRME165
C
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                                                                          ICRME166
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                                                                           1CRME167
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   NAT
                                                                          ICRME168
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                                                                          ICRME169
   NDS TR
          - NUMBER OF ENTRIES IN PARTICLE SIZE CLASS TABLE
                                                                           ICRME178
          - NUMBER OF ENTRIES IN THE WIND PROFILE TABLE
   NHO DO
                                                                           ICRME171
            ATMOSPHERIC PRESSURE AT CLOUD CENTER ALTITUDE (PASCALS)
C
                                                                           ICRME172
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   PHI
                                                                           ICRME173
            TIME. THE REMAINDER IS USED TO HEAT WATER
                                                                           ICRME174
   PPS T
          - ARRAY(8,10), TEMPORARY STORAGE OF FARCEL VARIABLES IN RSXP
C
                                                                           ICKME175
C
   PRS
          - ARRAY (256) ATMOSPHERIC PRESSURE (PASCALS) MATCHES ALT
                                                                           ICRME176
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C
   PS
                                                                          ICRME177
C
   PW
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                                                                           ICRHE178
          - CONVERSION FACTOR FOR FRACTION MASS TO NUMBER OF PARTICLES
                                                                          ICRME179
C
   Q
                      PER ###3
                                                                           ICRME180
```

Y COORDINATE (METERS)

ICRME121

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ICRME181
           FACTOR CONVERTS CLOUD TEMPERATURE TO VIRTUAL CLOUD
  QX
                                                                           ICRME182
            TEMPERATURE
            INVERSE OF FACTOR TO CONVERT AMBIENT TEMPERATURE TO
                                                                           ICRME183
  QXE
                                                                           ICPME184
            VIRTUAL AMBIENT TEMPERATURE
                                                                           ICRME185
          - CLOUD HORIZONTAL RADIUS
                                                                           ICRME186
          - GAS DENSITY OF CLOUD
  RΑ
                     CONVERTS DEGREES TO RADIANS
                                                                           ICRME187
          - PI/18G,
   RADC
                               RADIUS USED IN SUBROUTINE RSXP
                                                                           ICRME138
   RAD IUS -
            FALLOUT
                     PARCEL
            ARRAY (256) ATMOSPHERE AIR DENSITY (KGM/M**3) MATCHES ALT.
                                                                           ICRME139
   RHO
            FALLOUT PARTICLE DENSITY (KG/M++3)
                                                                           ICRME190
   RHOP
            SUBROUTINE, RUNGE-KUTTA-GILL INTEGRATION
                                                                           ICRME191
   RKGILL -
            ENTRAINMENT PARAMETER
                                                                           ICRME192
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                         ATTOSPHERE RELATIVE HUMIDITY MATCHES ALT (PERCENTIORME193
           ARRAY (256)
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                                                                           ICRME194
          - CLOUD MASS
   RM
                                                                           ICRME195
          - INITIAL AIR MASS IN CLOUD
   RMAG
                                                                           ICPME196
          - INITIAL WATER MASS IN CLOUD
   RNHO
          - SUBROUTINE WHICH PRESERVES AND/OR PESTORES ORM VARIABLES
                                                                           ICRME197
   RSTR
          - SUBROUTINE, ESTABLISHES FALLOUT PARCEL POSITIONS IN SPACE
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C
   RSXP
            ABOVE GZ AT STABILIZATION TIME.
                                                                           ICRME199
                                                                           ICRME230
          - VERTICAL CLOUD RADIUS
C
   RZT
                                                                            ICRME261
          - CONDENSED SOIL MIXING RATIO
          - GEOMETRIC STANCARD DEVIATION FOR A LOGNORMAL PARTICLE SIZE
                                                                           ICRME202
   SD
            DISTRIBUTION (SET EQUAL TO 4.0 IF NOT INFUT) (DIHENSIONLESS) ICRHE203
            FOR A SIZE-ACTIVITY PARTICLE DISTRN. THE CCDE SETS SD=-1.0
                                                                           ICRME204
          - EXPONENTIAL PARAMETER OF THE POWER-LAW PARTICLE DISTBN.
                                                                           ICRME2(5
   EXP0
                              A CONSTANT USED TO COMPUTE GLOUD SHAPE
                                                                           ICRME256
   SHAPE
          - EQUAL TO RZT/R.
                                                                            ICRME217
            WHEN U .GT. 0.0
                                                                            ICRME 208
   SHWIND - SUBROUTINE, READS SHOT-TIME WIND DATA
   SLOTHP - PARTICLE SOLIDIFICATION TEMPERATURE (K) DEFAULT VALUE 2240. ICRME219
   SMALLT - TIME AFTER START OF COMPUTATION
                                                                            ICRME210
   SOILHT - LATENT HEAT OF VAPORIZATION OF CLOUD SOIL CONSTITUENT
                                                                            ICRHE211
          - TOTAL MASS (KG) OF SOIL (OR WEAPON DEBRIS FOR AN AIRBURST)
                                                                           ICRME212
   SSAM
                                                                            ICRME 213
            IN THE CLOUD AT THE INITIAL TIME
                                                                            1CRME214
          - CLOUD TEMPERATURE (K)
   T
          - ATMOSPHERIC TEMPERATURE AT CLOUD CENTER ALTITUDE (K)
                                                                            ICRME 215
   TE
          - TIME (SEC) OF CETONATION
                                                                            ICRME 216
   TGZ
            TIME (SEC) OF INITIAL CONDITIONS SPECIFICATION RELATIVE TO
                                                                           ICRME217
   TME
                                                                            ICRME218
            DETONATION.
                                                                            IGRME219
          - INITIAL VAPOR TEMPERATURE (K)
   TMPG
          - INITIAL TEMPERATURE OF CONCENSED PHASE MATERIAL IN CLOUD (K) ICRME 220
   TMP S
          - TIME OF PARTICLE SOLIDIFICATION (SEC) WITHIN CLOUD
                                                                            ICRME221
   TMSD
          - SUBROUTINE, LINEAR INTERPOLATION
                                                                            ICRME222
C
   TRPL
           - R-RATE CLOUD RISE TERMINATION SHITCH PARAMETER
                                                                            ICRME223
   TSRD
C
           - TIME AT WHICH NEXT CX ARRAY ENTRIES ARE TO BE MADE
                                                                            ICRME224
   TSTM
C
           - TIME (SEC) OF THE FIREBALL SECOND TEMPERATURE MAXIMUM
                                                                            ICRNE225
C
   T2M
С
            CLOUD VERTICAL VELOCITY
                                                                            IGRHE 227
            CLOUD VOLUME
С
           - ARRAY(8), DUMMY VAFIABLES OF INTEGRATION (SUBS. DERIV, RKGILL) ICRNE228
   VBL
           - DYNAMIC VISCOSITY (KG/(M-SEC))
                                                                            ICRME 229
C
   VIS
           - MASS OF FALLOUT VAPOR (KG) AT THE INITIAL TIME
                                                                            1GRME 230
C
   VPR
           - ARRAY (100), X-COMPONENT OF WIND VELOCITY AT WIND PROFILE
                                                                            ICRME 231
C
   VX(I)
                                                                            ICRME232
             STRATUM I, (METERS/SEC)
C
           - ARRAY(100), Y-COMPONENT OF WIND VELOCITY AT WIND PROFILE STRATUM I, (METERS/SEC)
                                                                            1CRME 233
C
                                                                            ICRME 234
C
                                                                            ICPME235
           - TOTAL YIELD (KT)
C
    WNDSFT - SUBROUTINE, ACJUSTS FALLOUT PARCEL COORDINATES FOR WIND
                                                                            ICRME236
                                                                            ICRME237
             TRANSPORT DURING RISE AND EXFANSION AND FOR COORDINATE
C
                                                                            ICRME238
             TRANSLATION.
           - SOLIO AND LIQUID WATER MIXING RATIC
                                                                            ICRME239
    WT
           - IN-CLOUD WATER VAPOR MIXING RATIO
                                                                            ICRME240
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XF
          - AMBIENT AIR WATER VAPOR MIXING RATIO
                                                                           ICRNE241
   XGZ
           X COORDINATE OF GROUND ZERO (METERS)
C
                                                                            ICRNE242
          - ARRAY(200), NUMBER OF IN-CLOUD PARTICLES/UNIT VOLUME OF CLOUDICRME243
C
  YGZ
          - Y COORDINATE OF GROUND ZERO (METERS)
                                                                            ICRNE244
C
                                                                            ICRME245
   Z
          - CLOUD CENTER ALTITUDE (METERS)
C
   ZBFR
          - MAXIMUM Z OF CURRENT OR PREVIOUS ENTRIES TABULATED BY CXPN
                                                                            ICRME246
   ZBRSTZ - Z-COORDINATE OF BURST GROUND ZERO (METERS ABOVE MSL)
                                                                            ICRME247
                                                                            ICRME248
   ZLMT
           UPPER LIMIT FOR CLOUD CENTER ALTITUDE TO PREVENT POSSIBLE
            COMPUTATIONAL FUNAWAY
                                                                            ICRHE249
          - SCALED HEIGHT OF BURST (FT/(KT)++(1.0/3.4))
C
   ZSCL
                                                                            ICRME250
          - ALTITUDE OF CENTER PLANE OF WIND PROFILE STRATUM I (M MSL)
   ZV(I)
                                                                            ICRME251
          - IN SUBROUTINE RSXP, DISTANCE OF A FARCEL ABOVE CLOUD BASE
   ZVSB
                                                                            ICRME252
                                                                            ICRNE253
C
                                                                           ICRME254
C
                                                                            ICRME255
                                                                            ICRME256
      COMMON /8ASIC/ W.FH., ZBRSTZ, HEIGHT, ZSCL, SLOTMF, TMSD, XGZ, YGZ, TGZ
      COMMON /CONTRL/ DETID(12), IC(20), IRAD, IRISE, ISIN, ISOUT, JPARN, KDI
                                                                            ICRNE257
      COMMON /TABLES/ MCX, CX(50,10), GDPST(10,100)
                                                                            ICRNE258
C
                                                                            ICRME259
      DIMENSION CXTIM(50), CXTMP(50), NUMTAP(15)
                                                                            ICRME260
      EQUIVALENCE (CXTIM(1),GDPST(601)), (CXTMP(1),GDPST(651))
                                                                            ICRME261
C
                                                                            ICRME262
                                                                           FICRME263
C
C
                                                                            ICRNE264
COPY IN BASIC AND CONTROL DATA, ESTABLISH CONDITIONS IN THE FIREBALL AT ICRNE265
      INITIALIZATION TIME, SET UP FALLOUT PARTICLE SIZE DISTRIBUTION
                                                                            ICRME266
C
      TABLES AND PRINT HEADINGS AND DATA.
                                                                            ICKMEZ67
      ISIN =NUMTAP( 1)
                                                                            ICRHE268
      ISOUT=NUMTAP( 2)
                                                                            ICRME269
      CALL ICM
                                                                            ICRNE270
      IF(IC(3) .NE. D) RETURN
                                                                            ICRME271
      IRISE=NUMTAP( 3)
                                                                            ICRME272
      JPARN=NUMTAP( 4)
                                                                            ICRNE273
COFY IN ATMOSPHERE DATA
                                                                            ICRME274
      CALL ATMR
                                                                            ICRME 275
                                                                            ICRME276
COPY IN SHOT-TIME WIND DATA
      CALL SHWIND
                                                                            ICRME 277
COMPUTE INITIAL VALUES FOR THE CLOUD RISE EQUATIONS
                                                                            ICRME278
      CALL CRMINT
                                                                            ICRME279
COMPUTE THE DYNAMIC CLOUD RISE
                                                                            ICRME280
                                                                            ICRME281
      CALL CRM
COMPUTE TIME OF FALLOUT SCLISIFICATION
                                                                            ICRME282
      DO 122 MA=1.MCX
                                                                            ICRME283
      MB=MCX-MA+1
                                                                            ICRME284
                                                                            ICRME 285
      CXTIM(MA)=CX(MB,1)
  122 CXTMP(MA) = CX(MB, 9)
                                                                            ICRME286
      CALL TRPL(SLOTMP, MCX, CXTMP, CXTIM, THSO)
                                                                            ICRME 287
      WRITE (ISOUT, 513) SLDTMP, TMSD
                                                                            ICRME288
  513 FORMAT( ////10x,42HTIME OF SOIL SOLIDIFICATION AT TEMPERATUREF10. ICRNE289
         8H DEG. ISF9.4, 5H SEC.)
                                                                            ICRME 290
COMPUTE FALLOUT PARCEL DISTRIBUTION IN SPACE ABOVE GZ AT STABLIZATION
                                                                            ICRME291
                                                                            ICRME292
      CALL RSXP
COMPUTE WIND-ADJUSTED FALLOUT FARCEL COORDINATES AND TRANSLATE GZ AND
                                                                            ICRME 293
                                                                            ICRME294
      DETONATION TIME COCRCINATES. WRITE BINARY OUTPUT TAPE.
      CALL WNDSFT
                                                                            ICRME295
                                                                            ICRME296
      RETURN
      FND
                                                                            ICRME297
```

```
*DECK, ICH
                                                                           ICM
      SUBROUTINE ICH
                                                                           ICH
                                                                                   2
C
                                                                            ICM
C
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                           ICM
C
                                                                           ICM
                                                                           ICM
                                                                                   6
C
                                                                           TCM
C
      PROGRAM TO DETERMINE THE INITIAL CONDITIONS SPECIFICATIONS OF
                                                                            ICM
C
      TIME, TEMPERATURE, TOTAL SOIL MASS, FRACTION OF THE SOIL BURGEN INICH
C
      THE VAPOR PHASE. AND THE SIZE FREQUENCY DISTRIBUTION OF THE
                                                                           ICM
                                                                                  10
C
      CONDENSED PHASE SOIL OR AIRBURST PARTICLES. IT ALSO PRINTS A
                                                                           ICM
                                                                                  11
C
      HEADING AND PRINTS THE CRITICAL DATA.
                                                                           ICM
                                                                                  12
C
                                                                           ICM
                                                                                  13
C
                                                                           # ICM
                                                                                  14
C
                                                                            ICM
                                                                                  15
      COMMON /BASIC/ W,FW,ZBRSTZ,HEIGHT,ZSCL,SLDTMP,TMSD,XGZ,YGZ,TGZ
                                                                            ICM
      COMMON /CONTRL/ DETID(12), IC(20), IRAD, IRISE, ISIN, ISOUT, JPARN, KDI
                                                                           ICM
                                                                                  17
      COMMON /INITL/ F, PHI, SSAM, TME, TMPG, TMPS, VPR
                                                                           ICM
      COMMON /PARTCL/ NOSTR,RHCP, DMEAN,SD,PS(200),DIAM(201),FMASS(200)
                                                                           ICH
                                                                                  19
      EQUIVALENCE (DMEAN, CAYM), (SD, EXPO)
                                                                           ICH
C
                                                                            ICH
      DATA PROGRM /6H ICH
                                                                            IGM
                                                                                  22
                                                                           ICM
                                                                                  23
                                                                           #ICM
                                                                                  24
С
                                                                           ICM
                                                                                  25
                                                                            ICH
                                                                                  26
      FORMAT( /3x, 60HTHE SPECIFIED STANDARD DEVIATION IS NEGATIVE HENCEICM
   2
                                                                                  27
     1 INCORRECT///
                                                                            ICM
                                                                                  28
      FORMAT(8F13.0)
                                                                            TCM
                                                                                  29
      FORMAT( //25X, 28H**** BASIC PARAMETERS ****/ 20X, 24HYIELDS - TICM
     10TAL (FISSION), 21X, E12.5, 2H (L12.5, 4H) KT/ 20X, 24HHEIGHT OR DICH
     REPTH OF BURST, 21X, E12,5, 2X, 6HMETERS, 2H (E12.5, 21H FEET) KELAICM
     STIVE TO GZ/ 20X, 14HALTITUDE OF GZ, 31X E12.5, 7H METERS/ 20X,
                                                                           ICM
                                                                                  33
     4 13HSOIL CATEGORY)
                                                                           ICH
                                                                                  34
      FORMAT(1H+,65X,9HSILICEOUS)
                                                                           ICM
                                                                                  35
      FORMAT (1H+, 65X, 10HCALCAREOUS)
                                                                            ICM
                                                                                  36
                                 36HPARTICLE SIZE FREQUENCY DISTRIBUTION/ICM
      FORMAT( /20X,
                                                                                  37
     125X32HA LOG-NORMAL DISTRIBUTION WITH -/30X, 15HMEDIAN DIAMETER, 20X, ICM
                                                                                  38
     2E12.5,2X,11HMICROMETERS/37X,28HGEOMETRIC STANDARD DEVIATION, 7X,
                                                                                  39
                                                                           ICM
     3E12.5/25X, 34HTHIS DISTRIBUTION WAS SPECIFIED BY)
                                                                           16 M
                                                                                  40
      FORMAT (1H+,65X,11HTHE PRCGRAM)
                                                                           ICM
                                                                                  41
 q
      FORMAT(1H+,65X,8HTHE USER)
                                                                            ICH
 10
      FORMAT (2014)
                                                                            ICM
      FORMAT(/3x,56HTME SCALED DEPTH OF BURST IS BEYOND THE SCOPE OF THEIGH
     1 MODEL)
                                                                           ICM
                                                                                  45
   12 FORMATE 1H+, 65X, 36HNOT APPLICABLE.
                                             THIS IS AN AIRBURST)
                                                                           ICM
                                                                                  46
      FORMAT( //25x37H**** INITIAL CLOUD PROPERTIES AT H +E12.5,14H SECICM
                                                                                  47
     10NDS ****/ 20X,23HAVERAGE GAS TEMPERATURE38X,E12.5,2X,14HDEGREES ICM
     2KELVIN/ 20X,56HAVERAGE TEMPERATURE OF CONCENSED PHASE MATERIAL IN ICM
                                                                                  49
     3CLOUD, 5X, E12. 5, 2X, 14 DEGREES KELVIN/ 20X, 31 HMASS OF VAPORIZED SOILICH
                                                                                  50
     4 IN CLOUD, 30X, E12.5, 2X, 9HKILOGRAMS/ 20X41HMASS OF CONDENSED PHASE ICM
                                                                                  51
     5MATERIAL IN CLOUD, 20X, E12.5, 2X, 9HKILOGRAPS)
      FORMAT( //25X37H**** INITIAL CLCUD PROPERTIES AT H +E12.5,14H SECIOM
            ****/ 20x, 23HAVERAGE GAS TEMPERATURE38X, E12. 5, 2X, 14HDEGREES ICM
     10NDS
                                                                                  54
     2KELVIN/
                                            20X41HMASS OF CONDENSED PHASE ICM
                                                                                  55
     3MATERIAL IN CLOUD, 20X, E12, 5, 2X, 9HKILOGRAPS)
                                                                           ICM
                                                                                  56
      FORMAT(1X, 11HLEAVING ICM)
                                                                           ICH
                                                                                  57
                                                 *//55 X,11HD E L F I C//
   16 FORMAT( 1H1,
                      5JX, 19H*
                                                                           ICM
                                                                                  58
                                                    12X,101HT H E
                                                                     D E P ICM
                                                                                  59
                                                               PREDICION
     2ARTMENT
                       0 F
                             DEFENSE
                                              FALLCUT
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```
S Y S T E M//51X19H* * * * * * * * * * * * * * 36HINITIICM
    3T I O N
    4ALIZATION AND CLOUD RISE HODULE/// 55%, 11HPREPARED BY/ 46%, 30HICM
                                                                                 62
    5ATMOSPHERIC SCIENCE ASSOCIATES/ 54X, 14HBEDF0 RD, MASS.////25X,
                                                                           ICM
                                                                                  63
              RUN IDENTIFICATION ****, 3x, 12A6)
                                                                           ICM
                                                                                  64
     FORMAT(/3X,60HTHE SPECIFIED MEAN PARTICLE SIZE IS NEGATIVE HENCE IICM
                                                                                  65
17
    1NCORRECT///)
                                                                           ICM
                                                                                  06
  18 FORMAT(1HO, 9X, 89HPARTICLE SIZE DISTRIBUTION SUPPLIED IN TABULAR ICM
                                                                                  67
                                                                           ICM
                                                                                  68
    1 FORM BY THE USER (DIAMETERS ARE IN METERS))
     FORMAT ( 20X, 24HFALLCUT PARTICLE DENSITY, 21X, E12.5, 8H KG/M**3) ICM
                                                                                  69
                                                                                  70
     FORMAT( 20%, 23HSCALED HEIGHTS OF BURST, 38%, E12.5, 7H FEET (,
                                                                           ICM
                                                                           ICM
                                                                                  71
     1 E12.5, 8H METERS))
                               38HPARTICLE VOLUME FREQUENCY DISTRIBUTION/ICH
  24 FORMAT ( /20X.
                                                                                  72
    125x32HA LOG-NORMAL DISTRIBUTION WITH -/3Ux,15HMEDIAN DIAMETER,20 X, ICM
                                                                                  73
     2E12.5.2X.11HHICROMETERS/30X.28HGEOMETRIC STANDARC DEVIATION, 7X,
                                                                                  74
                                                                           ICH
                                                                                  75
  25 FORMAT (1H09X, 65HPARTICLE SIZE - MASS DISTRIBUTION TABLE (DIAMETERSICH
                                                                                  76
    1 ARE IN METERS))
                                                                           ICM
                                                                                  77
   26 FORMAT (/22X77H****
                           THE CONTROL VARIABLE ARRAY, IC(J), WAS GIVEN TICM
                                                                                  78
    THE FOLLOWING VALUES ++++/ 19X, 2014)
                                                                           ICM
                                                                                  79
   27 FORMAT(/20x, 36HPAFTICLE MASS FREQUENCY DISTFIBUTION/ 25x, 31HA POICM
    1 MER-LAW DISTRIBUTION WITH -/ 30X, 15HK-TO-MASS RATIO, 20X, 2PE12.5ICM
                                                                                  81
     2/ 30X, 21HEXPONENTIAL PARAMETER, 14X, 1PE12.5)
                                                                                  82
                                                                                  93
   28 FORMAT(1H0, 11x, 63HTHE PARTICLE DISTRIBUTION ABOVE IS A SIZE-ACTIICM
    1 VITY DISTRIBUTION)
                                                                           ICM
                                                                                  84
     FORNAT(//51X,19H+ + + + + + + + + *//)
                                                                           ICM
                                                                                  85
 193 FORMAT( 10x, 33HNUMBER OF PARTICLE SIZE CLASSES #15/
                                                                           ICH
                                                                                  88
          1HO, 20X, BHDIAMETER, 4X, 13HLOWER BOUNDRY, 5X, 8HFRACTION,
                                                                           ICH
                                                                                  87
     2 5X,14HUPPER BOUNDARY/)
                                                                           ICM
  194 FORMAT(12X, I3, 4(3X, E12.5))
                                                                           ICM
                                                                                  89
                                                                                  90
 195 FORMAT(2F10.0)
                                                                           ICM
  198 FORMAT(/3x,58HTHE PARTICLE SIZE DISTRIBUTION TABLE IS IMPROPERLY OICM
                                                                                  91
                                                                           ICH
                                                                                  92
     2RDERED///)
                                                            20X, 73HFRACT DICH
                                                                                  93
 1400 FORMATE
    IN OF THE TOTAL EXPLOSION ENERGY IN THE CLOUD AT THE INITIAL TIME = ICH
            20X, 51HFRACTION CF THIS ENERGY USED TO HEAT AIR AND SOIL =ICM
                                                                                  95
     2FG. 4/
                                                                           ICH
             20X, 37HFRACTION USED TO HEAT LIQUID WATER =F6.4/
                                                                                  96
                                                     20x, 37HFALLOUT SOLIDICM
                                                                                  97
                                                                                  98
     5 IFICATION TEMPERATURE = F8.3,
                                      4H (K))
 1709 FORMAT(1H019X30HCLOUC SUBDIVISION PARAMETERS -/ 23X, 52HNUMBER OFICM
                                                                                  99
     1 CLOUD SUBDIVISIONS IN THE VERTICAL (KDI) = 14/ 23X, 48HPARCEL HORICM
                                                                                 100
     2IZONTAL SUBDIVISION FARAMETER (IRAO) = 14)
                                                                           ICH
                                                                                 102
 1800 FORMAT(
                                                                           ICM
     120X22HDETONATION COORDINATES, 14X, 3HXGZ, 13X, 3HYGZ, 13X, 3HTGZ/
                                                                           ICM
                                                                                 163
                                                                           ICM
                                                                                 114
     244X,3(E13.6,3X))
C
                                                                            ICM
                                                                                 115
¢
                                                                           ICM
                                                                                 116
                                                                           ICH
C
                                                                                 107
                                                                           ICH
                                                                                 108
C
C
      READ RUN IDENTIFIER
                                                                            ICM
                                                                                 109
                                                                           ICM
      READ (ISIN. 1) DETID
                                                                                 110
C
      READ CONTROL PARAMETERS
                                                                            ICM
                                                                                 111
                                                                            ICM
      READ(ISIN, 10) IC
                                                                                 112
C
                                                                            IUM
                                                                                 113
      WRITE OVERALL TITLE
                                                                            ICH
                                                                                 114
C
      WRITE (ISOUT, 16) DETID
                                                                            ICM
                                                                                 115
      WRITE(ISOUT, 26) IC
                                                                            ICH
                                                                                 116
С
      READ IN BASIC DATA
                                                                           ICM
                                                                                 117
      READ(ISIN, 334, FW, HEIGHT, ZORSTZ, SLOTHE, PHI
                                                                            ICM
                                                                                 118
                           . AND.
                                  IC(2) .EQ. 0) SLDTMP=2200.
                                                                            ICH
                                                                                 119
      IF (SLOTMP .EQ. 0.0
      IF (SLOTMP .EQ. 0.0
                           . AND.
                                   IC(2) .EQ. 1) SLOTMP=2800.
                                                                           ICM
                                                                                 120
```

```
40 IF(SLOTMP .LE. 0.0) CALL ERROR(PROGRM, -40, ISOUT)
                                                                               ICH
                                                                                     121
      IF(PHI .EQ. 0.0) PHI=1.0
                                                                               ICM
                                                                                     122
      READ(ISIN, 10) NOSTR, KEI, IRAD
                                                                               ICM
                                                                                     123
      IF ( NOSTR .EQ. 0 ) NOSTR=100
                                                                               ICM
                                                                                     124
      IF(KDI .EQ. 0) KDI=15+ALOG(W)
                                                                                ICM
                                                                                     125
      READ(ISIN, 3)XGZ, YGZ, TGZ
                                                                               ICM
                                                                                     126
      IF(IC(1)-1)210,220,230
                                                                               ICM
                                                                                     127
C 210 A LOGNORMAL PARTICLE DISTRIBUTION IS SPECIFIED
                                                                               ICH
                                                                                     128
  210 READ(ISIN.3) DNS. DMEAN. SD
                                                                               ICM
                                                                                     129
      IS A LOGNORMAL DISTRIBUTION SPECIFIED BY THE USER
                                                                                ICH
                                                                                     130
      IS=0
                                                                               ICM
                                                                                     131
      IF(DMEAN.GT. 0.0) IS=1
                                                                               ICM
                                                                                     132
      GO TO 23
                                                                               ICM
                                                                                     133
C 220 A POWER-LAW PARTICLE DISTRIBUTION IS SPECIFIED
                                                                                ICM
                                                                                     134
      READ(ISIN, 3) DNS, CAYM, EXPO
                                                                                ICH
                                                                                     135
      GO TO 23
                                                                                1CM
                                                                                     136
C 230 A TABULAR PARTICLE DISTRIBUTION IS SPECIFIED
                                                                                ICM
                                                                                     137
  230 PEAD(ISIN. 3) DNS
                                                                                ICM
                                                                                     138
      READ (15 IN, 195) (DIAM (1), FMASS(I), 1=1, NDSTR)
                                                                                ICM
                                                                                     139
      LD=NDSTR+1
                                                                                ICM
                                                                                     140
                                                                                ICM
      READ(ISIN. 195) DIAM(LC)
                                                                                     141
C
                                                                                ICM
                                                                                     142
      CHECK ORDERING OF THE HISTOGRAM TABLE
                                                                                ICH
                                                                                     143
      DO 215 I=2,LD
                                                                                ICM
                                                                                     144
       IF(DIAM(I) .LT. DIAM(I-1)) GO TO 215
                                                                                ICM
                                                                                     145
      WRITE( ISOUT, 198)
                                                                                ICM
                                                                                     146
      GO TO 200
                                                                                ICM
                                                                                     147
  215 CONTINUE
                                                                                ICM
                                                                                     148
                                                                                ICH
   23 \text{ HOB} = \text{HEIGHT/0.3048}
                                                                                     149
      IF ( DNS \cdotEQ \cdot 0 \cdot 0 ) DNS = 2 \cdot 6
                                                                                ICM
                                                                                     150
      RHOP=DNS+1000.
                                                                                ICM
                                                                                     151
      ZSCL IS THE SCALED HCB - DOB
                                                                                ICM
                                                                                     152
C
      ZSCL = HOB /((W) + + (1.0/3.4))
                                                                                ICM
                                                                                     153
C
                                                                                ICM
                                                                                     154
      TEST THE SCALED HOB TO DETERMINE IF SUBSURFACE, LOW AIRBURST
                                                                                ICM
                                                                                     155
      OR PURE AIRBURST
                                                                                ICH
                                                                                     156
      IF(ZSCL+20.0 .LT, 0.0) GO TO 143
                                                                                ICH
                                                                                     157
                                                                                ICM
      IF(ZSCL .LT. 180.0) GO TO 70
                                                                                     158
      CALL AIRBRS
                                                                                ICM
                                                                                     159
      GO TO 95
                                                                                ICM
                                                                                     160
                                                                                ICM
 70
       CALL TIMEE
                                                                                     161
      CALL TEMP
                                                                                ICM
                                                                                     162
      CALL MASS
                                                                                ICM
                                                                                     163
                                                                                ICM
      CALL VAPOR
                                                                                     164
       IF(IC(1)-1)90,95,95
                                                                                ICM
                                                                                     165
C
                                                                                ICM
                                                                                     166
       TEST FOR ACCEPTABLE SPECIFICATIONS OF LOGNORMAL FARTICLE SIZE
                                                                                ICM
C
                                                                                     167
                                                                                ICM
C
       DISTRIBUTION
                                                                                     168
 96
                                                                                ICH
                                                                                     1 69
       IF(SD)91,92,92
       WRITE (ISOUT, 2)
                                                                                ICM
                                                                                     170
                                                                                ICM
                                                                                     171
       GO TO 200
                                                                                ICM
                                                                                     172
   92 IF (DMEAN) 94,95,95
       WRITE (ISOUT, 17)
                                                                                ICM
                                                                                     173
 94
       GO TO 230
                                                                                ICM
                                                                                     174
C
                                                                                ICM
                                                                                     175
       COMPUTE PARTICLE SIZE-VOLUME (MASS) FREQUENCY FISTOGRAM
                                                                                ICM
C
                                                                                     176
 95
                                                                                     177
                                                                                ICM
       CALL DSTBN
       SSAM = SSAM - VPR
                                                                                ICH
                                                                                     178
       PRINT INITIAL CONDITIONS RESULTS
                                                                                ICM
                                                                                     179
       WRITE(ISOUT, 4) W, FW, FEIGHT, HOB, ZBRSTZ
                                                                                ICM
```

```
IF( ZSCL .LT. 180. ) IF(IC(2))301,301,302
                                                                              ICH
                                                                                   181
      WRITE (ISOUT, 12)
                                                                              ICH
                                                                                   182
      WRITE( ISOUT, 14 ) THE, THPG, SSAM
                                                                              ICH
                                                                                   183
      GO TO 118
                                                                              ICM
                                                                                   184
 301
      WRITE (ISOUT.5)
                                                                              ICH
                                                                                   185
      GO TO 108
                                                                              ICH
                                                                                   186
 302 WRITE (ISOUT, 6)
                                                                              ICH
                                                                                   187
 108 WRITE (ISOUT, 13) THE, THPG, THPS, VPR, SSAM
                                                                              ICH
                                                                                   188
  118 ZSCM=ZSCL+0.3048
                                                                              ICM
                                                                                   189
      WRITE (ISOUT, 20) ZSCL, ZSCM
                                                                              ICH
                                                                                   190
      SET FRACTION OF EXPLOSION ENERGY IN THE CLOUD
                                                                              ICH
                                                                                   191
      F= . 45
                                                                              ICM
                                                                                   192
      RPHI=1.0-PHI
                                                                              ICM
                                                                                   193
      WRITE(ISOUT, 1400) F, PHI, RPHI, SLDTMP
                                                                              ICM
                                                                                   194
      WRITE (ISOUT. 1800) XGZ.YCZ.TGZ
                                                                              ICH
                                                                                   195
      WRITE(ISOUT,19) RHOF
                                                                              ICM
                                                                                   196
      IF(IC(1)-1)309,310,311
                                                                              ICM
                                                                                   197
  309 WRITE (ISOUT.7) DHEAN.SD
                                                                              ICM
                                                                                   198
      IF (IS) 102, 103, 102
                                                                              ICH
                                                                                   199
      WRITE (ISOUT, 8)
 103
                                                                              ICM
                                                                                    200
      GO TO 105
                                                                              ICH
                                                                                   201
 102
      WRITE (ISOUT, 9)
                                                                              ICH
                                                                                   202
 105 BARMU = EXP(ALOG(DHEAN) + 3.0*ALOG(SD)++2)
                                                                              ICM
                                                                                   203
      WRITE (ISOUT, 24) BARMU, SD
                                                                              ICH
                                                                                   204
      WRITE (ISOUT, 25)
                                                                              ICM
                                                                                   2115
      GO TO 315
                                                                              ICM
                                                                                    206
  310 WRITE(ISOUT, 27) CAYM, EXPO
                                                                              ICH
                                                                                    207
      GO TO 315
                                                                              ICH
                                                                                   208
  311 WRITE(ISOUT, 18)
                                                                              ICM
                                                                                   209
C
                                                                              ICM
                                                                                   210
C
      PRINT PARTICLE SIZE DISTRIBUTION TABLE
                                                                              ICM
                                                                                   211
C
                                                                              ICM
                                                                                    212
  315 WRITE (ISOUT, 193) NDSTR
                                                                              ICM
                                                                                   213
      00 602 J=1.NDSTR
                                                                              ICH
                                                                                   214
  602 HRITE(ISOUT,194)J,PS(J),DIAH(J+1),FMASS(J),DIAP(J)
                                                                              ICM
                                                                                   215
      CHECK IF PARTICLE DISTRIBUTION IS OF THE SIZE-ACTIVITY TYPE
                                                                              ICH
                                                                                   216
      IF(IC(5) .EG. 0) GO TO 603
                                                                              ICH
                                                                                   217
      SD=-1.0
                                                                              ICH
                                                                                   218
      WRITE (ISOUT, 28)
                                                                              ICM
                                                                                   219
                                                                              ICM
  603 WRITE(ISOUT, 1700) KCI, IRAD
                                                                                   220
      WRITE (ISOUT, 192)
                                                                              ICH
                                                                                   221
  200 WRITE (ISOUT,15)
                                                                              ICM
                                                                                   222
      RETURN
                                                                              ICM
                                                                                   223
      WRITE (ISOLT, 11)
                                                                              ICH
                                                                                   224
      GO TO 280
                                                                              ICM
                                                                                   225
      END
                                                                              ICH
                                                                                   226
```

```
*DECK, AIRBRS
                                                                    AIRBR
     SUBROUTINE AIRBRS
                                                                    AIRBR
                                                                    AIRBR
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                                                                    AIRBR
                                                                    AIRBR
  6
                                                                    AIRBR
     COMBINES FUNCTIONS OF SUBROUTINES TIME, TEMP, MASS, AND VAPOR
                                                                    AIRBR
     FOR AN AIRBURST. ALSO SETS LOGNORMAL DEERIS PARTICLE SIZE
C
                                                                    AIRBR
     DISTRIBUTION PARAMETERS FOR AN AIRBURST. A GECMETRIC STANDARD
                                                                    AIRBR 10
     DEVIATION OF 2.0 IS ASSUMED. THE MEDIAN PARTICLE DIAMETER WAS
                                                                    AIRBR 11
     COMPUTED FROM EQS. (43) AND (44) OF NATHANS, ET AL., JGR75, 7565
                                                                    AIRBR 12
     (1971) (FOR BROWNIAN MOTION)
                                                                    AIRBR 13
                                                                    AIRBR 14
                                                                  **AIRBR 15
                                                                    AIRBR 16
     COMMON /BASIC/ W,FW,ZBRSTZ,HEIGHT,ZSCL,SLDTMP,TMSD,XGZ,YGZ,TGZ
                                                                    AIRBR 17
     COMMON /CONTRL/ DETID(12), IC(20), IRAD, IRISE, ISIN, ISOUT, JPARN, KDI
                                                                    AIRBR 18
     COMMON /INITL/ F, PHI, SSAM, THE, TMPG, TMPS, VPR
                                                                    AIRBR 19
     COMMON /PARTCL/ NDSTR,RHCP, DMEAN,SD,PS(250),DIAM(201),FMASS(200)
                                                                    AIRBR 20
                                                                    AIRBR 21
         C
                                                                    AIRBR 23
                                                                    AIRBR 24
C
     SET TIME OF THE SECOND THERMAL MAXIMUM AND THE DELFIC INITIAL
C
     TIME (SEC)
                                                                    AIRBR 25
C
                                                                    AIRBR 26
     T2M = 0.045 * W**(0.42)
                                                                    AIRBR 27
     TME = 56. \pm 12M \pm W++(-0.30)
                                                                    AIKBR 28
C
                                                                    AIRBR 29
C
     SET INITIAL CLOUD TEMPERATURE
                                                                    AIRBR 30
                                                                    AIRBR 31
     A = 6847. + W++(-0.0131)
                                                                    AIRBR 32
     B = -0.4473 + W**(0.0436)
                                                                    AIRBR 33
     TMPG = A * (TME / T2M)**8 + 1500.
                                                                    AIRBR 34
     TMPS = TMPG
                                                                    AIRBR 35
                                                                    AIRBR 36
     SET MASS OF CONDENSEC PHASE MATERIAL IN THE CLOUD (KG)
                                                                    AIRBR 37
     SSAM = 93.718
                                                                    AIRER 36
     VPR = 0.0
                                                                    AIRBR 39
      IF(IC(1) .NE. 0 .OR. DMEAN .NE. J. 0) RETURN
                                                                    AIRBR 40
                                                                    AIRBR 41
     SET DEBRIS FARTICLE SIZE DISTRIBUTION PARAMETERS
                                                                    AIRBR 42
                                                                    AIRBR 43
      SD = 2.0
                                                                    AIRBR 44
     DMEAN = 0.15
                                                                    AIRBR 45
     RETURN
                                                                    AIRBR 46
                                                                    AIKBR 47
      END
```

```
*DESK , DST BN
                                                                         DSTBN
      SUBROUTINE DSTBN
                                                                          DSTBN
                                                                         DSTBN
                                                                                 3
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                         DSTBN
                                                                          DSTBN
 C
                                                                                 6
C
                                                                                 7
                                                                          DSTBN
C
      SETS UP HISTOGRAM TABLES OF PARTICLE MASS AS A FUNCTION OF
                                                                          OSTBN
                                                                                 8
C
      PARTICLE DIAMETER.
                                                                          DSTBN
                                                                                 9
                                                                          DSTBN 10
      LOGNORMAL DISTRIBUTION TO 100
                                                                          DSTBN 11
C
      POWER FUNCTION DISTRIBUTION TO 230
                                                                          DSTBN 12
C
      TABULAR DISTRIBUTION TO 300
                                                                          OSTBN 13
C
                                                                          DSTBN 14
      EQUATION 2 6.2.23 OF NBS-AMS 55 HANDBOOK IS USED TO COMPUTE THE
                                                                          DSTBN 15
      PROBABILITY FUNCTION ARGUMENT FROM THE RATIONAL FOLYNOMIAL
                                                                          DSTBN 16
      APPROXIMATION TO THE NORMAL PROBABILITY FUNCTION.
                                                                          DSTBN 17
C
                                                                          DSTBN 18
                                                                       ***DSTB() 19
                                                                          DSTBN 20
      COMMON /CONTRL/ DETID(12), IC(20), IRAD, IRISE, ISIN, ISOUT, JPARN, KDI
                                                                         DSTBN 21
      COMMON /INITL/ F, PHI, SSAM, THE, TMPG, TMPS, VFR
                                                                          DSTBN 22
      COMMON /PARTCL/ NDSTR,RHCP, DMEAN,SD,PS(200),DIAM(201),FMASS(200)
                                                                          DST8N 23
      EQUIVALENCE (DHEAN, CAYM), (SD, EXPC)
                                                                          DSTBN 24
      DATA PROGRM, PI/ 6HDSTBN , 3.141592654/
                                                                          DSTBN 25
C
                                                                          DSTEN 26
8 * * *
                                                                         *DSTBN 27
                                                                          DST8N 28
      TA(X) = SQRT(ALOG(1.0/X**2))
                                                                          OSTBN 29
      APX(X)=TA(X)-(2.515517+0.832853+TA(X)+u.010328+TA(X)++2)/
                                                                          DSTBN 30
     1(1.0+1.432788*TA(X)+0.189269*TA(X)**2+L.Cu13u8*TA(X)**3)
                                                                          DSTBN 31
C
                                                                          DSTBN 32
      LD=NOSTR+1
                                                                          DSTBN 33
      IF(IC(1)-1)100,269,300
                                                                          DSTBN 34
  100 IF (DMEAN) 111, 111, 112
                                                                          DSTBN 35
  111 DMEAN=0.407
                                                                          DSTBN
      SD=4.0
                                                                          DSTBN 37
 112 IF(NOSTR-1)101,101,102
                                                                          DSTBN 38
 101 PS(1) = DMEAN*1.0E-6
                                                                          DSTBN 39
      C5=SD**5
                                                                          DSTBN 40
      DIAM(1) = DME AN + 05 + 1 . 08 - 6
                                                                          DSTBN 41
      DIAM(2) = DME AN/C5 * 1. DE-6
                                                                          DSTBN 42
      FMASS (1)=1.0
                                                                          DSTBN 43
      GO TO 431
                                                                          OSTBN 44
  16 2 BARMU=ALOG (DME AN)
                                                                          DSTBN 45
      SIGMA=ALOG(SD)
                                                                          DSTBN 46
      BARMU=BARMU+3. *SIGMA**2
                                                                          DSTBN 47
      FRAC=1.0/FLOAT(NOSTR)
                                                                          DSTBN 48
      DO 133 ND=1,NDSTF
                                                                          DSTBN 49
  103 FMASS(ND)=FRAC
                                                                          DSTBN 50
      NH=NDSTR/2
                                                                          DSTAN 51
      00 104 I=1,NH
                                                                          DSTBN 52
      PRB=FLOAT(I)*FRAC
                                                                          DSTBN 53
      DIAM(I+1) = BARMU+APX (FRB; *SIGMA
                                                                          OSTON 54
      J=NDSTR-I+1
                                                                          DSTON 55
  104 DIAM(J)=BARMU-APX(PRB)*SIGMA
                                                                          DSTAN 56
                                                                          OSTBN 57
      FOR THE 2 EXTREME INTERVALS THE AVERAGE CLAMETER IS
C
                                                                          OSTBN 58
С
      ASSUMED TO BE AT HALF A MASS FRACTION FROM ZERO AND ONE
                                                                          OSTBN 59
C
                                                                          DSTBN 60
```

のでは、10mmのでは、

		PRB=FRAC 2.0	DSTBN	61
		PS(1)=BARMU+APX(PRB)*SIGNA	DSTBN	62
		PS(NDSTR)=BARMU-APX(FRB)*SIGMA	DSTBN	63
		OIAM(1) = 2. *PS(1) -0 IAM(2)	DSTBN	64
		DIAM(LD)=2, *PS(NDSTR)-DIAM(NDSTR)	DSTBN	65
C			DSTBN	66
C		CALCULATE MEAN DIAMETERS FROM BOUNDARY VALUES	DSTBN	67
С		'	DSTBN	68
		J=NDSTR-1	DSTBN	69
		IF(J-1)107,107,105	DSTBN	79
	105	00 196 I=2,J	DSTBN	71
		PS(I)=0.5*(DIAM(I)+ClAM(I+1))	DSTBN	72
	107	DO 108 I=1,NDSTR	DSTBN	73
		DIAM(I) = EXP(DIAM(I)) *1.0E-6	DSTBN	74
	106	PS(I)=EXP(PS(I))*1.0E-6	DSTBN	75
		DIAM(LD)=EXP(DIAM(LC)) *1.0E-6	DSTBN	76
		GO TO 400	DSTBN	77
	200	IF(EXPO .GE. 4.0) CALL ERROR(PROGRM, -200, ISOUT)	DSTBN	78
		AN=FLOAT(NDSTR)	DSTBN	79
		FRAC=1.0/AN	DSTBN	80
		00 205 I=1.NDSTR	DSTBN	81
	205	FMASS(I)=FRAC	DSTBN	82
		POW=1+07(4+0~EXPO)	OSTBN	b 3
		DMIN = (6.JMFRAC/(PI#RHOF#CAYM#POW))##POW	DSTBN	84
		DO 2J6 IJ=1,NDSTR	DSTBN	85
		AJ=IJ-1	DSTBN	86
	206	DIMOFRACION **PCHTDHIN	DSTBN	ċ7
		PS(NDSTR)=UMIN*0.5**POW	DSTBN	88
		DIAM(LO)=PS(NDSTR)++2/DIAM(NDSTR)	DSTBN	89
		NO=NOSTR-1	DSTBN	90
		DO 207 IJ=1,ND	USTBN	91
	207	PS(IJ)=SQRf(DIAM(IJ)*OIAM(IJ+1))	DSTBN	92
		no to 400	OSTBN	93
		DO 301 I=1,NDSTR	DSTRN	94
	361	PS(I)=SORT(DIAM(I)*DIAM(I+1))*1.4E-6	DSTBN	95
		DO 308 IJ=1,LD	GSTBN	
		DIAM(IJ)=1.0E-6*DIAM(IJ)	DSTBN	
	490	RETURN	DSTBN	
		END	DSTRN	વવ

```
*DECK, MASS
                                                                          HASS
      SUBROUTINE MASS
                                                                          MASS
                                                                          MASS
                                                                                  3
C
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                          MASS
                                                                                  4
                                                                                  5
C
                                                                          MASS
                                                             22 AM 44444444 MA SS
                                                                                  6
                                                                          MASS
                                                                                  7
C
      ESTIMATES MASS OF FALLOUT IN THE FIREBALL FCR A SURFACE, LOW
                                                                          MASS
                                                                                  8
C
                                                                                 9
      AIRBURST OR SHALLOW SUBSURFACE BURST.
                                                                          MASS
C
                                                                          MASS
                                                                                1.0
       *****************
C
                                                                         *MASS
                                                                                 11
                                                                          MASS
C
                                                                                 12
      COMMON /BASIC/ W.FW.ZBRSTZ, HEIGHT.ZSCL, SLDTMP, TMSD, XGZ, YGZ, TGZ
                                                                          MASS
                                                                                 13
                                                                          MASS
      COMMON /INITL/ F, PHI, SSAM, TME, TMPG, TMPS, VFR
                                                                                 14
C
                                                                          MASS
                                                                                15
С
                                                             16
C
                                                                          MASS
                                                                                17
C
      HOS OR DOS
                                                                          MASS
                                                                                18
                                                                          MASS
      IF (HEIGHT) 230, 240, 240
                                                                                19
 236
     D=2.181595
                                                                          MASS
                                                                                 20
                                                                          MASS
      Q=-ZSCL
                                                                                 21
      R=1.125E+02+(7.55E-01)*Q-(9.6E-06)*(Q**3.0)-(9.11E-12)*(Q**5.0)
                                                                          MASS
                                                                                 22
      S=3.27E+01+(8.51E-01)*Q-(2.52E-05)*(Q**3.0)+(1.78E-10)*(Q**5.0)
                                                                          MASS
                                                                                 23
                                                                          MASS
      SSAM= D*((W)**(3.0/3.4))*(R**2.0)*S
                                                                                 24
                                                                          MASS
                                                                                 25
      GO TO 250
                                                                          MASS
 240
      E=0.07740685
                                                                                 26
      SSAM=E+((W)++(3.0/3.4))+((180.0-ZSCL)++2.0)+(360.0+ZSCL)
                                                                          MASS
                                                                                 27
 250
      RETURN
                                                                          MASS
                                                                                 28
                                                                          MASS
      END
                                                                                29
                                                                          VAPOR
*DECK, VAPOR
                                                                          VAPOR
      SUBROUTINE VAPOR
C
                                                                          VAPOR
                                                                                  3
C
      H. G. NORMENT. ATMOSFHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                          VAPOR
                                                                          VAPOR
                                                                                  5
                                                                          VAPOR
                                                                                  6
                                                                          VAPOR
                                                                                  7
C
                                                                          VAPOR
Ç
      ESTIMATES PORTION OF FALLOUT MASS (CALC. BY SR MASS) IN THE
                                                                                  8
                                                                           VAPOR
C
      VAPOR STATE AT THE INITIAL TIME
                                                                           VAPOR 10
                                                                          VAPOR 11
C
                                                                          VAPOR 12
C
      COMMON /BASIC/ W.FW.ZBRSTZ.HEIGHT.ZSCL.SLDTMP.TMSD.XGZ.YGZ.TGZ
                                                                           VAPOR 13
      COMMON /CONTRL/ DETID(12), IC(20), IRAD, IRISE, ISIN, ISOUT, JPARN, KDI
                                                                          VAPOR 14
      COMMON /INITL/ F. PHI, SSAM, TME, TMPG, TMPS, VPR
                                                                          VAPOR 15
                                                                          VAPOR 16
                                                                          VAPOR 17
                                                                           VAPOR 18
C
C
      BRANCH ON THE BASIS OF SOIL CATEGORY
                                              -SILICEOUS TO 100,
                                                                          VAPOR 19
С
      CALCAREOUS TO 200
                                                                           VAPOR 20
                                                                          VAPOR 21
      IF(IC(2))130,100,200
                                                                          VAPOR 22
C
      IS THE COMPUTED VAPOR TEMPERATURE HIGHER THAN THE SILICEOUS SOIL
                                                                          VAPOR 23
C
      BOILING TEMPERATURE
                                                                           VAPOR 24
                                                                           VAPOR 25
 100
      IF (TMPG-3000.0) 120.120.110
      VPR=SSA M*0.00015+ (TMPG-3000.0)
                                                                           VAPOR 26
```

Ç			APOR APOR	
CC	200 115 120 130	IS THE COMPUTED VAPOR TEMPERATURE HIGHER THAN THE CALCAREOUS SOIL VBOILING TEMPERATURE IF (TMPG-3100.0)120,120,115 VPR=SSAM*0.00015*(TMFG-3100.0) GO TO 130 VPR='.0 RETURN		29 30 31 32 33 34 35
*(DECK,		TEMP TEMP	1 2
С		* · · · · · · · · · · · · · · · · · · ·	TEMP	3
C			LEMP	4
C		·	TEMP	5
C	****		LEMP	6
C		·	TE MP	8
ũ			TEMP	9
Č		·	TE MP	10
C	***	*******************	TE MP	11
С		·	TE MP	12
			TEMP	13
_			[EMP	14
C	***		TEMP	15 16
C		·	I E MP	17
C		·	TEMP	18
•		** · · · · · · · · · · · · · · · · · ·	TEMP	19
			TEMP	20
		A=5980.*((1.145)**(Q/180.))*((W)**(-0.03948+6.32637*Q/180.0))	TEMP	21
			TEMP	22
		The state of the s	TEMP	23
C		· · · · · · · · · · · · · · · · · · ·	TEMP	24
С			TEMP TEMP	25
			IEMP TEMP	26 27
			TEMP	28
		Market William Control of the Contro		

```
* DECK, TIMEE
                                                                             TIMEE
      SUBROUTINE TIMER
                                                                             TIMEE
C
                                                                             TIMEE
                                                                                     3
C
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                             TIMEE
                                                                             TIMEE
                                                                                     5
                                                                            **TIMEE
                                                                                     6
C
                                                                             TIMEE
                                                                                     7
      SETS TIME (RELATIVE TO DETONATION) OF THE INITIAL CONDITIONS
C
                                                                             TIMEE
                                                                                     8
C
                                                                                     9
      SPECIFICATIONS
                                                                             TIMEE
                                                                             TIMEE 10
                                                                            FTIMEE 11
C
                                                                             TIMEE 12
      COMMON /BASIC/ W.F. k., ZBRS1Z, HEIGHT, ZSCL, SLOTMP, TMSD, XGZ, YGZ, TGZ
                                                                             TIMEE 13
                                                                             TIMEE 14
      COMMON /INITL/ F, PHI, SSAM, TME, TMFG, TMFS, VPR
                                                                             TIMEE 15
Ç
                                                                           **TIMEE
                                                                                   16
C
                                                                             TIMEE
                                                                                    17
      Q=ZSCL+W++(-.03921)
                                                                             TIMEE 18
      T2M=0.037*((0.045/0.037) **(Q/180.))*(W**(0.49-(0.07*Q/180.)))
                                                                             TIMEE 19
      TME=(56.0+T2M)/(W++((.3))
                                                                             TIMEE 20
      RETURN
                                                                             TIMEL 21
      END
                                                                             TIMEE 22
*DECK . AT MR
                                                                             ATMR
      SUBROUTINE ATMR
                                                                             ATMR
                                                                                     2
                                                                             ATMR
                                                                                     3
C
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                             ATMR
                                                                                     5
                                                                             ATHR
                                                                             ATMR
                                                                                     6
                                                                             ATMR
                                                                                     7
C
      ATMR READS IN ATMOSPHERE TABLES
                                                                             ATMR
                                                                                     8
                                                                                     9
C
                                                                             ATMR
      ATMOSPHERE TABLE GLCSSARY- UNITS ARE FOR THE SCALED ENTRIES
                                                                              ATMR
                                                                                    10
                                                                              ATMR
                                                                                    11
        ALT - ALTITUDE ABOVE MSL (METERS)
                                                                              ATMR
                                                                                    12
C
    2
        ATP - TEMPERATURE (DEGREES KELVIN)
                                                                              ATMR
                                                                                    13
C
    3
        PRS - PRESSURE (PASCALS)
                                                                              ATHR
                                                                                    14
        RLH - RELATIVE HUMIDITY (PERCENT)
                                                                             ATMR
                                                                                    15
    4
    5
        RHO - DENSITY (KGM/M++3)
                                                                              ATMR
                                                                                    16
C
         ETA - VISCOSITY (KGM/(M-SEC))
                                                                              ATMR
                                                                                    17
                                                                              ATMR
                                                                                    18
    KATM=IC(4) IS THE ATMCSPHER DATA PRINT CONTROL
                                                                              ATMR
                                                                                    19
C
                                                                              ATMR
                                                                                    20
С
                                                                             *ATMR
C
                                                                              ATMR
                                                                                    22
                                                                             ATMR
      COMMON /ATMOS/ NAT, ALT(256), ATP(256), PRS(256), PLH(256),
                                                                                    23
               RHO(256), ETA(256), NHODO, ZV(100), VX(136), VY(130)
                                                                              ATMR
                                                                                    24
      COMMON /CONTRL/ DETID(12), IC(20), IRAU, IRISE, IS IN, I SOUT, JPARN, KDI
                                                                             ATMR
                                                                                    25
C
                                                                              ATMR
                                                                                    26
      DIMENSION FMT(12), SCALE( 8), ATMSUB(6), ATMZRO(6), ATMMAX(6), AP(6)
                                                                              ATMR
                                                                                    27
      DIMENSION ATID(12)
                                                                             ATMR
                                                                                    28
      DATA PROGRM/6H ATMR / ALIMIT/999999./
                                                                             ATMR
                                                                                    29
      DATA ATMSUB/-1J00.,294.65,.1139EE,77.,1.347,.18206E-4/
                                                                              ATMR
                                                                                    7.0
      DATA ATMIRO/ U.S.288.15,.13133E6, 77.,1.2250,.17894E-4/,
                                                                              AT MK
                                                                                    31
```

ATMR

ATMR

32

33

1ATMMAX/5.030.,270.65,.79779E2,4.0,.10269E-2,.17037E-4/

С

```
20 FORMAT(2014)
                                                                           ATMR
                                                                           ATMR
                                                                                 35
   30 FORMAT(12A6)
   46 FORMAT(8F10.0)
                                                                           ATMR
                                                                                 36
                                                                           ATMR
                                                                                 37
   44 FORMAT(1H1)
   46 FORMAT( 20X, 20HATMOSFHERE IDENTIFICATION - 12A 6//)
                                                                           ATHR
                                                                                 38
   47 FORMATE 37X,10HATMCSPHERE,51X//7X,3HALT,11X,3HATP,11X,3HPRS,11X,3ATMR
                                                                                 40
    1HRLH, 11X, 3HRHO, 11X, 3FETA)
   48 FORMAT( /(6(2X,E12.5)))
                                                                           ATMR
                                                                                 41
                                                                           ATMR
                                                                                 42
43
                                                                           ATMR
                                                                                  44
                                                                           ATHR
                                                                                  45
      READ (ISIN, 30) ATID
      KATM = IC(4)
                                                                           ATMR
                                                                                 46
                                                                           ATMR
      IF(KATH .GT. 0) WRITE(ISCUT, 44)
                                                                                 47
                                                                           ATHR
                                                                                  48
      WRITE(ISOUT, 46) ATID
                                                                           ATMR
                                                                                  49
      IGO = 0
                                                                           ATHR
                                                                                  50
      NBRNCH=1
      WAT COR= (1.-18./29.)/100.
                                                                           ATMR
                                                                                  51
                                                                           ATHR
                                                                                  52
                                                                           ATMR
                                                                                  53
      READ OBJECT-TIME FORMAT
                                                                           ATMR
                                                                                  54
C
                                                                           ATMR
                                                                                  55
      READ(ISIN, 30) FMT
                                                                           ATMR
                                                                                  56
C
                                                                                  57
C
      READ SCALE AND ACJUSTMENT FACTORS
                                                                           ATMR
                                                                           ATMR
                                                                                  58
C
      READ(ISIN, 40) SCALE
                                                                           ATMR
                                                                                  59
      00 90 I=1,6
                                                                           ATMR
                                                                           ATMR
      IF(SCALE(I))90,91,90
                                                                                  61
                                                                           ATMR
                                                                                  62
   91 SCALE(I)=1.
                                                                           ATMR
                                                                                  63
   90 CONTINUE
                                                                           ATMR
                                                                                  64
C
      READ ATMOSPHERE DATA SEQUENCE INDICIES
                                                                           ATMR
                                                                                  65
C
                                                                           ATMR
                                                                                  66
      READ(ISIN, 28) N1, N2, N3, N4, N5, N6
                                                                           ATMR
                                                                                  67
      READ ATMOSPHERE TABLE ENTRIES, SEQUENCE AND ADJUST THEM TO THE
                                                                           ATMR
                                                                                  68
      PROPER "NITS, AND WHERE APPROPRIATE COMPUTE THOSE ENTRIES NUT
                                                                           ATMR
C
                               ETA NEED NOT BE INPUT. EITHER PRS OR RHZATMR
      PROVIDED IN THE INPUT.
                                                                                  70
      (BUT NOT BOTH) NEEDS TO BE INPUT.
                                                                           ATMR
                                                                                  71
                                                                           ATHR
                                                                                  72
                                                                           ATMR
                                                                                  73
      I = 0
                                                                           AT MR
                                                                                  74
  100 READ(ISIN, FHT)AP
      IF (AP(N1) .GE. ALIPIT) GG TO 155
                                                                           ATMR
                                                                                  75
                                                                            ATMR
                                                                                  76
      ALT (I) = (AP(N1)+SCALE(7))+SCALE(1)
                                                                           ATMR
                                                                                  77
      ATP(I) = (AP(N2) +SCAL = (8)) +SCAL = (2)
                                                                           ATMR
                                                                                  78
      PRS(I) = AP(N3) + SCALE(3)
                                                                           ATMR
                                                                            ATMR
      RLH(I) = AP(N4) *SCALE(4)
                                                                                  80
      RHO(I) = AP(N5) * SCALE(5)
                                                                            ATHR
                                                                                  81
                                                                            ATMR
                                                                                  82
      ETA(I)=AP(N6)*SCALE(6)
                                                                            ATMR
                                                                                  83
      ARE SUCCESSIVE TABLE ENTRIES IN CRDER OF INCHEASING ALTITUDE-
                                                                            ATMR
C
                                                                            ATMR
                                                                                  85
      IF(I.EQ.1) GO TO 70
                                                                            ATMR
                                                                                  86
       IF (ALT(I)-ALT(I-1)) 45,45,70
                                                                            ATMR
                                                                                  87
   45 IRROR=-45
                                                                            ATMR
                                                                                  38
                                                                            ATMR
                                                                                  9ن
       WRITE(ISOUT,40) ALT(I), ALT(I-1)
                                                                                  91
      GO TO 133
                                                                            ATMR
   70 IF (ETA(I) .GT.0.0) GC TO 1070
                                                                            ATMR
                                                                                  91
       ETA(I)=1.458E-6*ATP(I)**1.5/(110.4+ATP(I))
                                                                                  92
                                                                            ATMR
                                                                            ATMR
                                                                                  93
  1070 IF(PRS(I).GT.0.0) GC TO 73
```

a law one and a second of the second of

```
IF (RHO(I).GT.0.0) GC TO 72
                                                                                  94
                                                                            ATMR
  71 IRROR=-71
                                                                            ATMR
                                                                                  95
      GU TO 130
                                                                            ATMR
                                                                                  96
   72 ES= 611.*(273./ATP(I))**5.13* EXP(25.*(ATP(I)-273. )/ATP(I))
                                                                            ATMR
                                                                                  97
      PRS(I)= 286.79* RHO(I)*ATP(I) +ES*RLH(I)*WATCOR
                                                                            ATMR
                                                                                  98
      GO TO 100
                                                                            ATMR
                                                                                  99
   73 IF' HO(I).GT.0.0) GO TO 100
                                                                            ATMR 100
      ES- 611.*(273./ATP(I)) ++5.13+ EXP(25.*(ATP(I)-273. )/ATP(I))
                                                                            ATMR 101
      RHO(I) = (PRS(I) - ES*RLH(I)*HATCOR)/(286.79*ATP(I))
                                                                            ATMR 102
      GO TO 100
                                                                            ATMR 103
                                                                            ATMR 104
  1°5 NAT=I
                                                                            ATMR 195
                                                                            ATHR 116
C
      DETERMINE IF THE TABLE MUST BE EXPANDED TO 256 ENTRIES
                                                                            ATMR 107
C
                                                                            ATMR 108
  110 IF(NAT -256)140,111,120
                                                                            ATMR 109
                                                                            ATMR 110
 111 THE TABLES DO NOT NEED EXPANSION. CHECK TO GETERMINE IF THE
                                                                            ATMR 111
      TABLES HAVE THE PROPER BOUNDRIES.
C
                                                                            ATMR 112
C
                                                                            ATMR 113
                                                                            ATMR 114
  111 IF (ABS(ALT(1)+ 1900.).LE.1.) GO TO 113
  112 IRROR=-112
                                                                            ATMR 115
      GO TO 136
                                                                            ATMR 116
  113 IF(A3S(ALT(256)-5.E4).LE.5).) GO TO 115
                                                                            ATMR 117
  114 IRROR=-114
                                                                            ATMR 118
      GO TO 130
                                                                            ATMR 119
C
                                                                            ATHR 120
C 115 THE TABLES HAVE THE PROPER BOUNDRIES. CHECK TO DETERMINE IF THE
                                                                            ATMR 121
                                                                            ATMR 122
      ALTITUDE INTERVALS ARE ALL. 203 METERS.
                                                                            ATHR 123
  115 00 116 I=2, 256
                                                                            ATMR 124
      IF(ABS(ALT(I)-ALT(I-1)-2(0.).GT.2.) IF(NBRNCH-1) 140,140,137
                                                                            ATMR 125
  116 CONTINUE
                                                                            ATMR 126
      GO TO 270
                                                                            ATMR 127
                                                                            ATMR 128
  120 IRROR=-120
  130 CALL FRROR (PROGRM, IRROR, ISOUT)
                                                                            ATMR 129
                                                                            ATHR 130
  137 IRF
           -137
                                                                            ATMR 131
            131
      GO
                                                                            ATMR 132
C
                                                                            ATMR 133
C 140 THE TABLES NEED EXPANSION OR INTERVAL ADJUSTMENT
                                                                            AT MR 134
  140 REWIND IRISE
                                                                            ATMR 135
                                                                            ATMR 136
      DO THE TABLES BEGIN AT - 10JO METERS-
C
                                                                            ATMR 137
C
      IF NOT MAKE AN ENTRY AT -1000 METERS FROM THE ARDC STANDARD ATMOS.ATMR 138
                                                                            ATMR 139
      IF(A9S(ALT(1)+1000.) .GT. 1.) GO TO 150
                                                                            ATMR 140
                                                                            ATHR 141
      ALT(1)=-1000.
                                                                            ATMR 142
      GO TO 200
  15 ( WRITE (IRISE) ATMSUB
                                                                            ATMR 143
  160 IGO=IGO+1
                                                                            ATMR 144
                                                                            ATMR 145
      CO THE TABLES HAVE AN ENTRY AT
                                           0 METERS-
                                                                            ATMR 146
                                    O METERS FROM THE ARDC STANDARD ATMOS. ATMR 147
      IF NOT MAKE AN ENTRY AT
C
С
                                                                            ATMR 148
                   .LE. 0.0(1) GO TO 203
                                                                            ATMR 149
      IF(ALT(1)
      WRITE (IRISE) AT MZRG
                                                                            ATMR 150
                                                                            ATMR 151
      IGO=IGO+1
                                                                            ATMR 152
      STORE THE INPUT TABLES ON TAPE
                                                                            ATMR 153
```

```
ATMR 154
С
  200 DO 210 I=1, NAT
                                                                            ATMR 155
  210 WRITE(IRISE)ALT(I),ATP(I),PRS(I),RLH(I),RHO(I),ETA(I)
                                                                             ATHR 156
                                                                             ATMR 157
                                                                             ATMR 158
      DO THE TABLES HAVE AN ENTRY AT 51300 METERS-
      IF NOT MAKE AN ENTRY AT SOLUT METERS FROM THE ARCO STANDARD ATMOS.ATMR 159
С
C
                                                                             ATMR 160
      IF(ALT(NAT ) .GE. 5.E4) GO TO 220
                                                                             ATMR 161
      IF (A9S(ALT(NAT )-5, E4). LE. 50.) GO TO 220
                                                                             ATMR 162
      WRITE (IRISE) ATMMAX
                                                                             ATMR 163
      NAT=NAT+1
                                                                             ATMR 164
C
                                                                             ATMR 165
C
      INITIALIZE FOR THE TABLES EXPANSION
                                                                             ATMR 166
                                                                             ATMR 167
  220 REWIND IRISE
                                                                             ATMR 168
      NAT=NAT+IGO
                                                                             ATMR 169
      IF(NAT -256)222,222,221
                                                                             ATMR 170
  221 IRROR=-221
                                                                             ATMR 171
      GO TO 139
                                                                             ATMR 172
  222 DALT=200.
                                                                             ATMR 173
      NA=1
                                                                             ATMR 174
      READ(IRISE)ALT(1),ATP(1),PRS(1),RLH(1),RHO(1),ETA(1)
                                                                             ATMR 175
                                                                             ATMR 176
      A1=ALT(1)
      A2 = ATP(1)
                                                                             ATMR 177
                                                                             ATMR 178
      43=PRS(1)
      A4=RLH(1)
                                                                             ATMR 179
                                                                             ATMR 180
      A5=RHO(1)
                                                                             ATMR 181
      A6=ETA(1)
                                                                             ATMR 182
      EXPAND THE TABLES TO 256 ENTRIES IN 200 METERS INTERVALS IN
                                                                             ATMR 183
С
      ALTITUDE FROM -1000 TO 50000 METERS BY LINEAR INTERPOLATION
                                                                             ATMR 184
                                                                             ATMR 185
C
      FROM THE INPUT TABLES
                                                                             ATMR 186
      00 260 I=2,256
                                                                             ATMR 187
      ALT(I)=ALT(I-1)+DALT
                                                                             ATMR 188
                                                                             ATMR 189
  225 IF(A1.GE.ALT(I))GO TO 250
                                                                             ATMR 190
      IF(ALT(I)-A1 .LT. 2.) GO TO 250
                                                                             ATMR 191
      NA = NA + 1
      IF(NAT - NA .GE.()GC TO 240
                                                                             ATMR 192
                                                                             ATMR 193
  230 IRROR=-230
                                                                             ATMR 194
      GO TO 130
  240 READ(IRISE) A1. A2. A3, A4. A5, A6
                                                                             ATMR 195
      GO TO 225
                                                                             ATMR 196
                                                                             ATMR 197
  250 TERP= DALT
                       /(A1-ALT(I-1))
      ATP(I) = ATP(I-1) + TERF + (A2-ATP(I-1))
                                                                             ATMR 198
      PRS(I)=PRS(I-1)+TERP*(A3-PRS(I-1))
                                                                             ATMR 139
                                                                             ATHE 2 .
      KLH(I) = KLH(I-1) + TERP* (A4-RLH(I-1))
      FHD(I)=FHO(I-1)+TERP*(A5-RHU(I-1))
                                                                             ATER 2.1
      "TA(T)=""A(I-1)+TERF*(A6-ETA(I-1))
                                                                             ATMR 212
  262 CONTINUE
                                                                             ATMR 253
                                                                             ATMR 204
      NAT = 256
      NBRNCH=2
                                                                             ATMR 205
      GO TO 111
                                                                             ATMR 206
  279 IF (KATH .EQ. 0) RETURN
                                                                             ATMR 207
      WRITE(ISOUT,47)
                                                                             ATMR 238
      WRITE(ISOUT,48 )(ALT(I),ATP(I),PRS(I),RLH(I),RHC(I),ETA(I),
                                                                             ATMR 209
          I=KATM, NAT, KATM)
                                                                             ATMR 210
                                                                             ATMR 211
      RETURN
                                                                             ATMR 212
      END
```

```
*DECK, SHWIND
                                                                          SHWIN
      SUBROUTINE SHWIND
                                                                          SHWIN
                                                                          SHWIN
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                                                                          SHWIN
                                                                          SHWIN
                                                                                  6
                                                                          SHWIN
      READS IN SHOT TIME WIND DATA ABOVE GROUND ZERO
                                                                          SHWIN
      THESE WINDS ARE USDE TO COMPUTE WIND SHEAR EFFECTS ON CLOUD RISE
                                                                         SHWIN
      AND TO TRANSPORT THE CLOUD AND FALLOUT WHILE THE CLOUD RISES AND
                                                                         SHWIN 10
      STABILIZES.
                                                                          SHWIN 11
                                                                          SHWIN 12
                                                                 ********SHWIN 13
                                                                          SHWIN 14
       COMMON /ATMOS/ NAT, ALT (256), ATP (256), PRS (256), RLH (256),
                                                                          SHWIN 15
              RHO (256), ETA (256), NHODG, ZV(100), VX(100), VY(100)
                                                                          SHWIN 16
                                                                         SHWIN 17
      COMMON /CONTRL/ DETID(12), IC(20), IRAU, IRISE, IS IN, ISOUT, JPARN, KOI
                                                                          SHWIN 18
      INTEGER FORM, NETEOR, RESOLV
                                                                          SHWIN 19
      DIMENSION SCALE (5), AP(3), FMT(12)
                                                                          SHWIN 20
      DATA ALIMIT , RADC , PROGRM , METEOR , RESOLV
                                                                          SHWIN 21
     1 / 999999. ,.0174532925, 6HSHWIND, 4HMETE , 4HRESO /
                                                                          SHWIN 22
C
                                                                          SHWIN 23
    1 FORMAT(2014)
                                                                          SHWIN 24
    2 FORMAT ( 1H1, 37X, 19FSHOT-TIME WIND DATA// 19X, 8HRAW DATA, 36X, 1SHWIN 25
     14HPROCESSED DATA// 8x, 1HZ, 9x, 10HVX OR DIR., 3x, 11HVY OR SPEED, SHWIN 26
     2 14X, 1HZ, 12X, 2HVX, 12X, 2HVY/)
    3 FORMAT( 3(2X,1PE12.5))
                                                                          SHWIN 28
    4 FOPMAT( 1H+, 47X, 3(2X,1PE12.5))
                                                                          SHWIN 19
    5 FORMAT( 14 /, 9X. 39HSHOT-TIME WINDS HAVE NOT BEEN SPECIFIED)
                                                                          SHWIN 30
    6 FORMAT( BF10.0)
                                                                          SHWIN 31
    7 FORMAT( 12A6)
                                                                          SHWIN 32
                                                                          SHWIN 33
   8 FORMAT(6X, A4)
                                                                          SHWIN 34
                                                              *********** SHWIN 35
C
                                                                          SHWIN 36
      NHODO=0
                                                                          SHWIN 37
      TRNS= 0.
                                                                          SHWIN 38
COPY IN DATA TYPE INDICATOR AND FORMAT
                                                                          SHWIN 39
      READ(ISIN,8) FORM
                                                                          SHWIN 40
      READ(ISIN.7) FMT
                                                                          SHWIN 41
      WRITE (ISOUT, 2)
                                                                          SHWIN 42
COPY IN WIND DATA SCALE FACTORS AND DATA POINTERS
                                                                          SHWIN 43
      READ(ISIN,6) SCALE
                                                                          SHWIN 44
                                                                          SHWIN 45
      READ(ISIN,1) N1, N2, N3
      009 I=1.3
                                                                          SHWIN 46
   9 IF( SCALE(I) .EQ. 0.0 ) SCALE(I) = 1.0
                                                                          SHWIN 47
      IF(FORM .EQ. METEOR) TRNS=SCALE(3)*SCALE(5) - 185.
                                                                          SHWIN 48
COPY IN WIND DATA
                                                                          SHWIN 49
  100 READ(ISIN, FMT) AP
                                                                          SHWIN 50
      IF (AP (N1) .GE. ALIMIT) GO TO 200
                                                                          SHWIN 51
      NHODO = NHODO+1
                                                                          SHWIN 52
COPY OUT RAW WIND DATA
                                                                          SHWIN 53
      WRITE(ISOUT,3)AP(N1), AP(N2), AP(N3)
                                                                          SHWIN 54
  10 IF(NHODO .GT. 101) CALL ERROR( PROGRM, -10, ISCUT)
                                                                          SHWIN 55
COMPUTE SCALED WIND DATA
                                                                          SHWIN 56
      7V(NHODO) = (AP(N1) + SCALE(4))*SCALE(1)
                                                                          SHWIN 57
      IF(FORM .EQ. RESOLV) GO TO 15
                                                                          SHWIN 58
      VX(NHODO)=AP(N3)+SCALE(2)+SIN(RADC+(AP(N2)+SCALE(3) + TRNS))
                                                                          SHWIN 59
      VY(NHODO) = AP(N3) + SCALE(2) + COS(RABC+(AP(N2) + SCALE(3) + TRNS))
                                                                          SHWIN 61
```

```
GO TO 50
                                                                      SHWIN 61
     VX(NHODO) = AP(N2) *SCALE(2)
 15
                                                                      SHWIN 62
     VY(NHODO) = AP(N3) *SCALE(2)
                                                                      SHWIN 63
COPY OUT SCALED WIND DATA
                                                                      SHWIN 64
  50 WRITE(ISOUT, 4) ZV (NHODO), VX (NHODO), VY (NHODO)
                                                                      SHWIN 65
     GO TO 100
                                                                      SHWIN 56
  200 IF (NHODO 1GT. 3) RETURN
                                                                      LHWIN 67
     WRITE(ISOUT,5)
                                                                      OHWIN 35
     ARTURN
                                                                      SHWIN 69
     END
                                                                      SHWIN 70
*DECK.CPFR
                                                                      CPFR
     SUBROUTINE CPFR
                                                                      CPFR
                                                                             2
                                                                      CPFR
C
     H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1976
                                                                      CPFR
C
                                                                      CPFR
                                                                             5
C
                                                                     * CPFR
                                                                             6
C
                                                                             7
C
     CPFR COMPUTES PARTICLE FALLOUT RATE
                                                                      CPFR
C
                                                                      CPFR
                                                                    * CPFR
C
                                                                            10
                                                                      CPFR
                                                                            11
                                 ,C2
                                       , C3
                                              , C6
                                                                     , CPFR
     COMMON /CLOUD/ CHANGE, CM LR
                                                     .DEK
                                                             . DRM
                                                                            12
                                              . DU
            , DST
                   .DSTO
                          ,OST1
                                       ,UT
                                                             XC.
                                 ,OST2
                                                     , DWT
                                                                     , CPFR
                                                                            13
                                       . HLR
                                                             . MWYA
    2 02
            , ED
                   ,EK
                          .EPS
                                 .ES
                                              • KS
                                                     . KSV
                                                                     . CPFR
                   , P `
    3 N
                          .PW
                                 ,R
                                       , RA
                                              , RL
                                                                     , CPFR
            , NNN
                                                     , RM
                                                             , RZT
                                                                            15
                                                                     , CPFR
    4 S
            , SAVE
                  ,SHAPE ,SMALLT,T
                                              • U
                                       , TE
                                                     , V
                                                             , WT
                                                                            16
                   , Z
                          ,ZBFR ,ZLMT
                                       , SPARE
            •XE
                                                                      CPFR
                                                                            17
     COMMON /CONTRL/ DETID(12),IC(20),IRAD,IRISE,ISIN,ISOUT,JPARN,KDI
                                                                      CPFR
     COMMON /PARTGL/ NDSTR,RHCP,DMEAN,SD,PS(200),DIAM(201),FMASS(200)
                                                                      CPFR
                                                                            19
     COMMON /TABLES/ MCX, CX(50,10), GDPST(1J,100)
                                                                      CPFR
                                                                            20
C
                                                                      CPFR
                                                                            21
     DIMENSION Y (200), CG (200)
                                                                      CPFR
                                                                            22
     EQUIVALENCE (Y(1), GDPST(1)), (CG(1), GDPST(201))
                                                                      CPFR
                                                                            23
                                                                      CPFR
                                                                            24
  903 FORMAT (1H1////////
                                                                      CPFR
                                                                            25
    1 20X30HNEGATIVE PARTICLE DENSITY
                                                               ///// CPFR
                                                                            26
  2CCURATE. DAVIES NUMBER IS TOO LARGE FOR THE 13, 8H TH SIZE// 24X, CPFR
    * CPFR
                                                                            30
                                                                      CPFR
                                                                            31
C
                                                                      CPFR
                                                                            32
                             *******
                                                                      CPFR
                                                                            33
C
                                                                      CPFR
                                                                            34
C
                                     TEST FOR IMPOSSIBLE PARTICLE
                                                                      CPFR
                                                                            35
                                                                      CPFK
      DO 951 J=1,NDSTR
          IF(Y(J)) 902, 91, 9 .
                                                                      しゃデー
          CONTINU
                                                                      UPFE
          GO TO 9"
                                                                      UPFR
                                                                            39
  932 WRITE(ISOUT, 03)
                                                                      CPFR
                                                                            41
      MWYA = 3
                                                                      CPFR
                                                                            41
      GO TO 008
                                                                      CPFR
                                                                            42
                                                                      CPFR
900
          CONTINUE
                                                                            43
                                                                      CPFR
C
                                                                            44
      COMPUTE PARTICLE FALLOUT RATES
                                                                      CPFR
```

C

the constitution of the second second

```
C
                                                                             CPFR
                                                                                    46
      VIS=1.4585-6*T** 1.5/(110.4+T)
                                                                             CPFR
                                                                                    47
      DO 3 J=1,ND STR
                                                                             CPFR
                                                                                    46
      CALL SETTLE (PS(J), RIOF, RA, VIS, T, P, CG(J), IACCR)
                                                                             CPFR
                                                                                    49
      IF(MMYA.EQ. 1 .ANC. IACCR .NE. 0) WRITE(ISCUT,758) J
                                                                             CPFR
                                                                                    50
      CONTINUE
                                                                             CPFR
                                                                                    51
                                                                             CPFR
                                                                                    52
      COMPUTE OVERALL LOSS RATE OF FALLOUT FROM THE CLOUD AND ADJUST
                                                                             CPFR
                                                                                    53
C
      IN-CLOUD PARTICLE CONCENTRATIONS
                                                                             CPFR
C
                                                                             CPFR
                                                                                    55
      CMLR=0.
                                                                             CPFR
                                                                                    56
      A= 3.1415927+R**2*DST
                                                                             CPFR
                                                                                    57
      DO 1 J=1.NDSTR
                                                                             CPFR
                                                                                    58
      C=0.5235988*PS(J)**3
                                                                             CPFR
                                                                                    59
      D=A+CG(J)
                                                                             CPFR
                                                                                    60
      CHLR=CHLR+C+D+Y(J)
                                                                             CPFR
                                                                                    61
    1 Y(J)=Y(J)*(1.~D/V)
                                                                             CPFR
                                                                                    62
      CMLR=CMLR*RHOP/DST
                                                                             CPFR
                                                                                    63
  COS RETURN
                                                                             CPFR
                                                                                    64
      END
                                                                             CPFR
                                                                                    65
*DECK, CRM
                                                                             CRM
      SUBROUTINE CRM
                                                                             CRM
                                                                             CRM
                                                                                     3
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1976
                                                                             CRM
                                                                             CRM
C
                                                                           ** CRM
C
                                                                             CRM
C
      COMPUTE THE DYNAMIC CLOUD RISE
                                                                             CRM
C
                                                                             CRM
C
      THIS CODE CLOSELY FOLLOWS THAT OF HUEBSCH, "THE DEVELOPMENT OF A
                                                                             CRM
                                                                                    10
      WATER-SURFACE-BURST FALLOUT MODEL - THE FISE AND EXPANSION OF THE CRN
                                                                                    :1
      ATOMIC SHOUD! USNEDE-TR-74% (25 APRIL 1964), AND !TURRULINGE,
                                                                             URM
      TORQUUAL CIRCULATION AND DISPONSION OF FALLOUT FROM THE RUSING
                                                                             CRM
C
      NUCLEAR CLOUD*, USNRDL-TR1054 (5 AUGUST 1966). THE HUEBSCH MODEL CRM
C
      HAS BEEN MODIFIED AS DESCRIBED BY NORMENT, VALIDATION AND
                                                                             CRM
C
      REFINEMENT OF THE DELFIC CLOUD RISE MODULE. DNA 4320F(15JAN1977) CRM
                                                                                    16
                                                                             CRM
                                                                                    17
                                                                           ** CRM
                                                                                    18
                                                                             CRM
                                                                                    19
                                            ,C3
                                                   ,C6
      COMMON /CLOUD/ CHANGE, CHLR
                                    .C2
                                                           , DEK
                                                                            , CRM
                                                                    .DRM
                                                                                    20
     1 DS
              ,DST
                     ,DSTO ,DST1
                                    ,OST2
                                            , OT
                                                   , DU
                                                           , DWT
                                                                    .OX
                                                                            . CRM
                                                                                    21
                             ,EPS
     2 DZ
              ,ED
                     ,EK
                                    , ES
                                            , HLR
                                                   , KS
                                                           , KSV
                                                                    , MWYA
                                                                            , CRM
                                                                                    22
                     , P
                             ,PW
              , NNN
     3 N
                                                                            , CRM
                                    •R
                                            , RA
                                                   , RL
                                                           , RM
                                                                    •RZT
                                                                                    23
              ,SAVE
                    ,SHAPE ,SMALLT,T
     4 5
                                                                            , CRM
                                            , TE
                                                           , V
                                                   , U
                                                                    , HT
                                                                                    24
                     , Z
                             ,ZPFR ,ZLMT ,SPARE
                                                                             CRM
                                                                                    25
      COMMON /CONTRL/ DETID(12), IC(20), IRAD, IRISE, ISIN, ISOUT, JPARN, KDI
                                                                             CRM
                                                                                    26
      COMMON /PARTCL/ NDSTR:RHCP:DMEAN:SD:PS(200);DIAM(201);FMASS(200)
                                                                             CRM
                                                                                    27
      COMMON /TABLES/ MCX, CX(50,10), GDPST(10,100)
                                                                             CRM
                                                                                    28
                                                                             CRM
                                                                                    29
      DIMENSION Y (200)
                                                                             CRM
                                                                                    30
      EQUIVALENCE (Y(1), GCPST(1))
                                                                             CRM
                                                                                    31
                                                                             CRM
                                                                                    32
C
                                                                             FCRM
                                                                                    33
C
                                                                             CRM
                                                                                    34
```

CRM

35

COMPUTE THE PARTIAL PRESSURE OF THE WATER VAPOR IN THE CLOUD

```
CRM
                                                                                       36
   35 PW=P*X*29./(18.+29.*X)
                                                                                CRM
                                                                                       37
C
                                                                                CRM
                                                                                       38
      COMPUTE SATURATION WATER VAPOR PRESSURE AND CLOUD AIR MASS
C
                                                                                CRM
                                                                                       39
C
                                                                                CRM
                                                                                       40
      ES=611.*(T/273.)**(-5.13)*EXP((25.*(T-<math>\angle73.))/T)
                                                                                CRM
                                                                                       41
      PA-RM/V*(1.+X)/(1.+X+S+WT)
                                                                                CRM
                                                                                       42
C
                                                                                CRM
                                                                                       43
C
      WET OR DRY EQUATIONS
                                                                                CRM
                                                                                       44
C
                                                                                CRM
                                                                                       45
      GO TO (150,1531,1531),N
                                                                                CRM
                                                                                       46
  150 IF(ES-PW)152,152,1531
                                                                                CRM
                                                                                       47
C
                                                                                CRM
                                                                                       48
C
      STORE VARIABLES (KSV=1) OR RESTART AT PREVIOUS TIME STEP (KSV=2)
                                                                                       49
                                                                                GRM
C
                                                                                CRM
                                                                                       50
  152 KSV=2
                                                                                CP M
                                                                                       51
 1532 CALL RSTR
                                                                                CRM
                                                                                       52
    9 VTEMPY=V
                                                                                CRM
                                                                                       53
                                                                                CRM
                                                                                       54
C
      INTEGRATE
                                                                                       55
                                                                                CRM
C
                                                                                CRM
                                                                                      56
      CALL RKGILL
                                                                                CRM
                                                                                       57
C
                                                                                CRM
                                                                                       58
           ADJUST IN-CLOUD FARTICLE CONCENTRATIONS TO BE CONSISTENT WITH CRM
                                                                                       59
C
      CLOUD VOLUME CHANGE
                                                                                CRM
                                                                                       60
                                                                                CRM
                                                                                       61
      00 46 J=1,NOSTR
                                                                                URM
                                                                                       62
   86 Y(J)=Y(J)*VTEMPY/V
                                                                                CRM
                                                                                       53
C
                                                                                GR M
                                                                                       64
С
      ACCUMULATE CLOUD TIME
                                                                                CRM
                                                                                       65
C
                                                                                CRM
                                                                                       66
                                                                                CRM
      SMALLT = SMALLT + DST
                                                                                       67
C
                                                                                CRM
                                                                                       68
      TEST FOR TIME STEP CHANGE
                                                                                CRM
                                                                                       69
                                                                                UR"
      IF (ABS (SMALLT = 1. 0).LT.0.001) GO TO 87
                                                                                       7 U
      IF(SMALLT-1.0)8,87,88
                                                                                CRM
                                                                                       71
   87 DST=OST1
                                                                                CRM
                                                                                       72
   88 R=SQRT(3.*V/(RZT*12.5663706E0))
                                                                                CRM
                                                                                       73
      GC TO 35
                                                                                       74
                                                                                5.33
                                                                                رين)
                                                                                       1 5
U
                                                                                       76
      COMPUTE FARTICLE FALLOUT RATE
(
                                                                                CZII
                                                                                       77
                                                                                CRH
C
 1531 CALL OPER
                                                                                LRM
                                                                                       78
      GO TO (931,901,8), MWY.
                                                                                CRM
                                                                                       79
  901 IF(IC(6) .NE. 0) CALI DBG
                                                                                CRM
                                                                                       80
      CALL DOSN
                                                                                CRM
                                                                                       81
    8 CALL CXPN
                                                                                CRM
                                                                                       82
      GO TO (724,724,148), MYA
                                                                                CRM
                                                                                       83
  724 KSV=1
                                                                                CRM
                                                                                       84
                                                                                       85
                                                                                CRM
       GO TO 1532
                                                                                CRM
                                                                                       86
  148 CALL CRMW
      PETURN
                                                                                CRM
                                                                                       87
       END
                                                                                CRM
                                                                                       68
```

```
*DECK.CRMINT
                                                                             CRMIN
      SUBROUTINE CRMINT
                                                                             CRMIN
                                                                             CRMIN
                                                                                     3
C
      H. G. NORMENT, ATMCSFHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                             CRMIN
                                                                             CRMIN
                                                                                     5
                                                                            * CR MIN
                                                                                     6
                                                                             CRMIN
      INITIALIZE CLOUD AND PARTICLE VARIABLES FOR THE CYNAMIC CLOUD RISECRMIN
C
                                                                             CRMIN
C
                                                                           **CRMIN 10
                                                                             CRMIN 11
      COMMON /ATMOS/ NAT, ALT (256), ATP (256), PRS(256), FLH(256),
                                                                             CRMIN 12
               RHO(256), ETA(256), NHODO, ZV(100), VX(100), VY(100)
                                                                             CRMIN 13
      COMMON /BASIC/ W.FW,ZBRSTZ,HEIGHT,ZSCL,SLDTMP,TMSD,XGZ,YGZ,TGZ
                                                                             CRMIN 14
                                           , C3
      COMMON /CLOUD/ CHANGE, CMLR , C2
                                                   ,06
                                                           , DEK
                                                                   ,DRM
                                                                            , CRMIN 15
     1 DS
              .OST
                     ,OSTO ,OST1
                                    ,DST2
                                            , CT
                                                   , DU
                                                           , DWT
                                                                   ,DX
                                                                            .CAMIN 16
                             , EPS
                                    ,ES
                                            ,HLR
     2 DZ
              , ED
                     ,EK
                                                   ,KS
                                                          ,KSV
                                                                    , MWYA
                                                                            , CRMIN 17
                     , P
                            , PW
                                            , RA
     3 N
                                                           • RM
                                                                   ,RZT
              • NNN
                                    ,R
                                                   , RL
                                                                            , CRMIN 18
     4 S
              ,SAVE
                    ,SHAPE ,SMALLT,T
                                                   , U
                                                           , V
                                            , TE
                                                                    .WT
                                                                            , CRMIN 19
                     , 2
                            ,ZBFR ,ZLMT ,SPARE
              ,XE
                                                                             CRMIN 20
      COMMON /INITL/ F, PHI, SSAM, THE, THPG, THPS, VFR
                                                                             CRMIN 21
      COMMON /PARTCL/ NDSTR,RHOP, DMEAN,SD, PS(2J0), DI AM(2C1), FMASS(2DC)
                                                                             CRMIN 22
      COMMON /TABLES/ MCX, CX(50,10), GDPST(10,100)
                                                                             CRMIN 23
C
                                                                             CRMIN 24
      DIMENSION Y (200), CG (200)
                                                                             CRMIN 25
      EQUIVALENCE (Y(1), GDPST(1)), (CG(1), GDPST(201))
                                                                             CRMIN 26
                                                                             CRMIN 27
C
                                                                            *CKMIN 28
C
                                                                             CRMIN 29
      CHANGE=130.
                                                                             CRMIN 30
      CMLR=0.
                                                                             CRMIN 31
      SMALLT=0.
                                                                             CRMIN 32
      WT=0.
                                                                             CRMIN 33
      N=1
                                                                             CRMIN 34
      MWYA=1
                                                                             CRMIN 35
      KS = 0
                                                                             CRMIN 36
      DST0 = .03125
                                                                             CRMIN 37
      DST1 = 0.25
                                                                             CRMIN 38
      DST2 = 2.5
                                                                             CRMIN 39
      DST=DST0
                                                                             CRMIN 40
      SSAM=SSAM+VPR
                                                                             CRMIN 41
      COMPUTE TURBULENCE CRAG PARAMETER
                                                                             CRMIN 42
C
                                                                             CRMIN 43
      C2 = AMAX1( 0.004, AMIN1( 0.100, 0.1 * W**(-0.333333333) ))
                                                                             CRMIN 44
      SET TURBULENT ENERGY DISSIPATION PARAMETER
                                                                             CRMIN 45
                                                                             CRMIN 46
      C3=0.175
                                                                             CRMIN 47
      C6=1.0
                                                                             CRMIN 48
C
                                                                             CRMIN 49
      T=TMPG
                                                                             CRMIN 50
C
C
      COMPUTE CLOUD CENTER HEIGHT, VOLUME, RADII, INITIAL MIXING RATIOS LAMIN 52
                                                                             CRMIN 53
      Z=HEIGHT+ZBRSTZ+ 90.*W**3.3333333333
                                                                             CKMIN 54
      CALL TRPL(Z,NAT ,ALT,ATP,TE)
                                                                             CRMIN 55
      CALL TRPL(Z,NAT ,ALT,PRS,P)
CALL TRPL(Z,NAT ,ALT,RLH,HLR)
                                                                             CRMIN 56
                                                                             CRMIN 57
      XE=109,93*HLR*(TE/273.)**(-5.13)*EXP((25.*(TE-273.))/TE)/(P*29.)
                                                                             CRMIN 58
                                                                             CRMIN 59
C
      TAD=0.
                                                                             CRMIN 66
```

```
IF(TMPS-848.)5,5,6
                                                                           CRMIN 61
                                                                           CRNIN 62
   5 TPR=TMPS
     GO TO 7
                                                                           CRMIN 63
   6 TPR = 848.
                                                                           CRMIN 64
      TAD=1013.8*(THPS-TPR)+0.06755*(TMPS**2-TPR**2).
                                                                           CRMIN 65
    7 SOILHT: SSAM* (TAD+781.6* (TPR-TE) +0.2856* (TPR**2-TE**2)+
                                                                           CRMIN 66
                                                                           CRMIN 67
     11.361E+7*(1./TPR-1./TE))
                                                                           CRMIN 68
      TAD=0.
                                                                           CRMIN 69
      TPR=T
                                                                           CRMIN 70
      IF(TPR-2300.)17,17,16
  16 TAD= -5587.57(TPR-2300.) + 1.0625*(TPR**2-(2300.)**2)
                                                                           CRMIN 71
                                                                           CRMIN 72
      TPR = 23.0.
   17 FQ=4.18E12*F*H-SOILHT
                                                                           CRMIN 73
      RMAO=PHIFFQ/(TAD+946.6F(TPR-TE)+0.09855F(TPRFF2-TEFF2)+XEF(1697.66CRMIN 74
     1 *(T-TE) +0.572087*(T** 2-TE**2)))
                                                                           CRHIN 75
      RMHO=FQ*(1.-PHI)/(1697.66*(T-TE)+0.572087*(T**2-TE**2)+2.5E6)
                                                                           CRNIN 76
     1 +RMAO#XE
                                                                           CRMIN 77
      X=RMWO/RMAO
                                                                           CRHIN 78
                                                                           CRMIN 79
      RM=RMAO+RMWO+SSAM
                                                                           CRMIN ED
      S=SSAM/RMAO
      V=(RMAD+RMHO) *287. *T* (1.+29. *X/18.)/(P*(1.+X))
                                                                           CRMIN 81
                                                                           CRMIN 82
      R=0.
      SET SHAPE SO THAT THE CLOUD IS AN OBLATE ELLIPSOID WITH
                                                                           CRMIN 83
      ECCENTRICITY=0.75
                             COMPUTE HORIZONTAL AND VERTICAL GLOUD RADII CRMIN 84
      SHAPE = 0.66144
                                                                           CRMIN 85
                                                                           CRMIN 86
C
      IF(V.GT.0.0) R=(3.*V/(12.5663706* SHAPE ))**(1.0/3.0)
                                                                           CRHIN 87
                                                                           CRMIN 88
      RZT = SHAPE FR
      COMPUTE INITIAL RISE VELOCITY
                                                                           CRMIN 89
                                                                           CRMIN 90
C
                                                                           CRHIN 91
      U=1.2 SQRT (9.8 R)
                                                                           CRMIN 92
      COMPUTE INITIAL TURBULENT KINETIC ENERGY DENSITY
C
                                                                           CRMIN 93
C
      EK=0.5*U**2
                                                                           CRMIN 94
      COMPUTE INITIAL TURBULENT ENERGY LOSS RATE
                                                                           GRAIN 95
C
                                                                           CRMIN SE
C
                                                                           CRMIN 97
      EPS=C3' (2. *EK)**1.5/RZT
                                                                           CRNIN 98
C
      COMPUTE ENTRAINMENT PARAMETER
                                                                           CRRIN 99
C
      RL = AMAX1( AMAX1( 0.12, 0.1 + W++0.1 ), 0.01+W++0.33333333333333)
                                                                           OR WINLOU
                                                                           CRMIN101
C
      COMPUTE INITIAL IN-CLOUD PARTICLE CONCENTRATIONS
                                                                           CRHIN: 02
                                                                           CRPINSES
C
      Q=S/(1.0+X+S)*RM/(V*RHOP*0,5235988)
                                                                           ORMINIC4
      DO 801 J=1,NDSTR
                                                                           OR MIN105
                                                                           CR MIN106
      Y(J)=FHASS(J) #Q/PS(J) ##3
                                                                           CRMIN107
  881 CG(J)=0.
      UPPER LIHIT FOR Z TO PREVENT PROGRAM RUNAWAY
                                                                           CRMINLES
C
                                                                           GR HIN109
      ZLMT=10000.0*WF*C.25 + HEIGHT + ZBRSTZ
                                                                           GR KIN110
      RETURN
                                                                           CRMIN: 11
      END
                                                                           CRMIN:12
```

```
*DECK, CRMW
                                                                            CRMW
                                                                                   1
                                                                            CRMW
                                                                                   2
      SUBROUTINE CRHW
C
                                                                            CRMM
                                                                                    3
C
      H. G. NORMENT, ATMOSFHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                            CRMW
                                                                                    5
C
                                                                            CRHW
С
                                                                 ****************************
                                                                                    6
C
                                                                            CRMW
C
      CRMW PRINTS SUMMARY OF OUTPUT OF THE CLOUD RISE MODULE.
                                                                            CRMW
                                                                                   9
C
                                                                            CRMM
                                                                ******
                                                                                  10
C
C
                                                                            CRMW
                                                                                   11
      COMMON /CONTRL/ DETID(12), IC(20), IRAD, IRISE, ISIN, ISOUT, JPARN, KOI
                                                                            CRMW
                                                                                   12
      COMMON /TABLES/ MCX, CX(50,10), GDPST(10,100)
                                                                            CRMW
                                                                                   13
¢
                                                                            CRMW
                                                                                   14
    8 FORMAT (1H1///8X, 42HCLOUD RISE AND GROWTH HISTORY FOR RUN *** 12A 6) CRMW
                                                                                   15
   20 FORMAT(/
                                                                            CRMW
                                                                                   16
        49X19HCLOUD HISTORY TABLE//
                                                                            CRKH
                                                                                   17
        5X5 (3 X5HCLOUD, 3X), 3X4HBASE, 8X3HTOP, 7X6HRADIAL,
                                                                            CRMM
                                                                                   18
        3X11HTEMPERATURE, 4X, 3+GAS/
                                                                            CRMW
                                                                                   19
        8 X4HTIME, 5 X8HINTERVAL, 5 X4HBASE, 8 X3HTOP, 6 X6HRADIUS, 3 X3 (3 X4HRATE, 4X), 14X, 7HDENSITY/
                                                                            CRMW
                                                                                   20
                                                                            CRMW
                                                                                   21
        5X2(3X5H(SEC), 3X), 3(4X3H(M), 4X), 3(2X7H(M/SEC), 2X),4X,
                                                                            CRMW
                                                                                   22
        3H(K),5X1CH (KG/M**2)// (1XI2, 1H), 1X, 10E11.4))
                                                                            CRMW
                                                                                   .: 3
             C
                                                                                   25
                                                                            CRMW
C
                                                                                   26
      WRITE(ISOUT, 6) DETID
                                                                            CRMW
                                                                                   27
      WRITE(ISOUT, 20)(J, (CX(J, I), I=1, 10), J=1, MCX)
                                                                            CRMW
                                                                                   28
                                                                            CRMW
      RETURN
                                                                                   29
                                                                            CRMW
                                                                                  30
      END
```

```
*DECK CXPN
                                                                             CXPN
      SUBROUTINE CXPN
                                                                             CXFN
                                                                                    2
                                                                             CXPN
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                             CXPN
С
                                                                             CXPN
C
      CXPN TABULATES THE CLOUD RISE AND EXPANSION CUTFUT TABLE ARRAY CX CXPN
      AND TESTS FOR R-RATE, U. EK, AND MCX SHUT-OFF
                                                                             CXPN
                                                                                     8
                                                                            * UXPN
                                                                             CXPN
                                                                                   10
      COMMON /BASIC/ W.FW, ZBRSTZ, HEIGHT, ZSCL, SLDTMP, TMSD, XGZ, YGZ, TGZ
                                                                             CXPN
                                                                                   11
                                                   , C6
                                                          • DEK
                                                                   , DRH
                                                                            . CXPN
                                                                                    12
      C MMON /CLOUD/ CHANGE, CMLR , C2 , C3
                                                   , DU
                                                          , DWT
                                                                   XC.
                                                                            .CXPN
     1 05
              , DS T
                     1720, 0120,
                                   DST2 DT
                                                                                   13
                             ,EPS
                                    , ES
                                            , HLR
                                                   , KS
                                                          , KSV
     2 72
                                                                   AYWM .
                                                                            , CXPN
              ,ED
                     , EK
                                                                                   14
                     ,P
                                           , RA
                                                   ,RL
                                                           • RM
                             ,PW
                                                                                   15
                                    ,R
                                                                   , RZT
                                                                            . CXPN
     3 N
              , NNN
              , SAVE
                     ,SHAPE ,SMALLT,T
                                           , TE
                                                                   OWT
                                                   • U
                                                           , V
                                                                            .CXPN
     4 S
                     , 7
              ,XE
                             ,ZBFR ,ZLMI ,SPARE
                                                                             CXPN
                                                                                   17
      COMMON /CONTRL/ DETID(12), IC(20), IRAO, IRISE, ISIN, ISOUT, JPARN, KDI
                                                                                   18
                                                                             CXPN
      COMMON /INITL/ F. PHI. SSAM. TME, TMPG, TMPS, VPR
                                                                             CXPN
                                                                                   19
      JOMMON /TABLES/ MCX, CX (50,13), GDP5T(10,100)
                                                                             CXPN
                                                                                    20
C
                                                                             CXPN
                                                                                    21
                                                                             CXPN
      DATA WORD1. WORD2. WCRD3 /6HR RATE, 6H MCX . 6H U,EK /
                                                                                    22
                                                                             CXPN
C
                                                                                    23
 5000 FORMAT(////10x,46HCLOUD RISE IS TERMINATED IN CXPN AT STATEMENT ICXPN
     14. 8H BY THE AG. 7H SWITCH///)
                                                                             CXPN
                                                                             CXPN
                                                                            *CXPN
                                                                                    27
                                                                             CXPN
C
                                                                                    28
C
      PERFORM FIRST PASS INITIALIZATION
                                                                             CXPN
                                                                                    29
C
                                                                             CXPN
                                                                                    30
      GO TO (002, 020, 040), MEYA
                                                                             CXPN
                                                                                    31
  002 DO 004 MJ = 1, 10
                                                                             CXPN
                                                                                    32
      DO 034 MI = 1, 50
                                                                             CXPN
                                                                                    33
                                                                             CXPN
                                                                                    34
  (04 CX (MI, MJ) = 0.0
                                                                                    35
                                                                             CXPN
      MCX = 1
      MWYA = 2
                                                                             CXPN
                                                                                    36
      DLTM = 0.0
                                                                             CXPN
                                                                                    37
                                                                             CXPN
                                                                                    38
      TSTM = SMALLT
      TSRE = AMAX1(10., AMIN1(23. + 9. * ALOG10(W), 60.))
                                                                             CXPN
                                                                                    39
                                                                             CXPN
                                                                                    40
      TSQD=CXP(0.014778*ALCG(W)-7.0499)
      ZBFR = Z
                                                                             CXPN
                                                                                    41
      GO TO 046
                                                                             CXPN
                                                                                    42
                                                                             CXPN
                                                                                    43
                                                                             CXPN
                                                                                    44
      IS IT TIME TO RECORD CLOUD STATUS IN THE CX ARRAY
                                                                             CXPN
                                                                                    45
         YES - TO 640
         No - 70 176
                                                                             571.H
                                                                                    46
                                                                             UXPN
      TF ( "ALLT - TET!) . Fo, J- ,
                                                                             CX:14
      CX (10x, 1) = 3"ALLT
                                                                             UXFIL
       TF (7 - 23FF) 441, 444, 144
                                                                             LXFN
                                                                                    51
  141 74 = ZAFR
                                                                             LXIN
                                                                             CXFN
                                                                                    53
       GO ) 143
                                                                             CXFN
                                                                                    53
  942.7A = 7
  743 CX (MCX+ 5) = 3
                                                                             LXPN
                                                                                    54
                                                                                    55
                                                                             LXPN
      CX (MCX; 9) = T
                                                                             CXFN
                                                                                    56
      CX(MCX, 10) =RA
                                            TEST TO AND CRE COMPUTATION
                                                                             JXFN
                                                                                    27
                                                                             CXPN
      TEL MOX .LE. 5 ) GO TO 543
```

```
CXPN
      IF ( TSRD .LT. TSTR .OR. U .GT. 0.0 ) GC TO 343
                                                                                      61
                                                                                CXPN
  243 \text{ MHYA} = 3
                                                                                       62
                                                                                CXPN
      NSTAT=243
                                                                                       63
      WRITE (ISOUT, 5000) NSTAT, WORD1
                                                                                CXPN
                                                                                       64
      GO TO 543
                                                                                CXPN
                                                                                       65
                                                                                CXPN
  343 IF ( TSRE .LT. EK .CR. U .GT. 0.0 ) GO TO 543
                                                                                       66
                                                                                CXPN
                                                                                       67
  443 \text{ MWYA} = 3
      NSTAT=443
                                                                                CXPN
                                                                                       68
      WRITE(ISOUT,5000)NSTAT,WORD3
                                                                                CXPN
                                                                                       69
  543 \text{ CX (MCX, 3)} = ZA - RZT
                                                                                CXPN
                                                                                       7 U
                                                                                CXFN
      CX (MCX, 4) = ZA + RZT
                                                                                       71
  060 \text{ MCX} = \text{MCX} + 1
                                                                                CXPN
                                                                                       72
                                             CHECK CAPACITY OF ARRAY CX
                                                                                CXPN
                                                                                       73
      IF (MCX - 50) 062, 062, 061
                                                                                CXPN
                                                                                       74
                                                                                CXPN
                                                                                       75
  061 \text{ MWYA} = 3
      NSTAT=61
                                                                                CXPN
                                                                                       76
      WRITE(ISOUT, 5000) NSTAT, WORD2
                                                                                CXPN
                                                                                       77
  £62 CXM = MCX
                                                                                CXPN
                                                                                       78
                                                                                       79
                                                                                CXPN
C
      COMPUTE THE TIME AT WHICH THE NEXT CX ARRAY ENTRIES ARE TO BE MADECXPN
                                                                                       80
                                                                                CXPN
                                                                                       81
      DLTH = DLTH + CXH + .084946
                                                                                CXPN
                                                                                       62
      TSTM = TSTM + DLTM
                                                                                CXPN
                                                                                       83
  065 IF (Z - ZBFR) 068, U68, 067
                                                                                CXPN
                                                                                       84
  967 \text{ ZBFR} = Z
                                                                                CXPN
                                                                                       85
  068 GO TO (070, 074, 100), MHYA
                                                                                CXPN
                                                                                       46
  070 RETURN
                                                                                CXPN
                                                                                       87
                                              COMPLETE OUTPUT CX TABLE
                                                                                CXPN
                                                                                       88
  100 MCX = MCX - 1
                                                                                CXPN
                                                                                       89
      IF (CX (MCX - 1, 1) - CX (MCX, 1)) 182, 166, 192
                                                                                CXPN
                                                                                       90
  102 DO 104 MK = 2, MCX
                                                                                CXPN
                                                                                       91
C
                                              COMPUTE TIME INTERVAL LENGTH
                                                                                CXPN
                                                                                       92
      CX (MK - 1, 2) = CX (MK, 1) - CX (MK - 1, 1)
                                                                                CXPN
                                                                                       93
C
                                              COMPUTE VERTICAL RATES
                                                                                CXPN
                                                                                CXPN
                                                                                       95
      CX (MK - 1, 6) = (CX (MK_n 3) - CX (MK - 1, 3)) / CX (MK - 1, 2)
      CX (MK-1, 7) = (CX (YK, 4) - CX(MK-1, 4)) / CX (MK-1, 2)
                                                                                       96
                                                                                CXPN
                                               COMPUTE KADIAL RATE
                                                                                CXPN
                                                                                       97
  104 CX (MK - 1, 8) = (CX (MK, 5) - CX (MK - 1, 5)) / CX (MK - 1, 2)
                                                                                CXPN
                                                                                       ખુ 8
      00 116 ML = 1, MCX
                                                                                CXPN
                                                                                       99
                                                                                CXPN 1.0
  106 \text{ CX } (ML, 1) = \text{CX } (ML, 1) + \text{TME}
      GO TO 171
                                                                                UK-N 1 1
       7110
                                                                                LX-11 2
```

```
DBG
*DECK, DBG
                                                                                        1
                                                                                DBG
      SUBROUTINE DBG
C
                                                                                DBG
                                                                                        3
C
      H. G. NORMENT. ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                                UBG
C
                                                                                DBG
C
                                                                                DBG
C
                                                                                DRC
                                                                                        7
C
                                                                                D8G
      CRM DEBUG PRINTOUT
C
                                                                                D8G
                                                                                        9
                                                                               DBG
                                                                                       10
                                                                                DBG
                                                                                       11
      COMMON /CLOUD/ CHANGE, CMLR
                                      .C2
                                             ,C3
                                                             , DEK
                                                                      . DRM
                                                                               , DBG
                                                     .06
                                                                                       12
                                                                      , DX
                                             , DT
                                                     • DU
              .DST
                                                                               , DBG
     1 DS
                      .OSTO .DST1
                                     ,OST2
                                                             . DWT
                                                                                       13
                      ,EK
                                      ,ES
                              ,EPS
                                             , HLR
                                                     ,KS
                                                             , KSV
                                                                      AYWM.
                                                                               , D8G
     2 DZ
              , ED
                                                                                       14
                      , P
                              ,PH
                                             , KA
                                                                                       15
              , NNN
                                      •R
                                                             , RM
                                                                      , RZT
                                                                               , DBG
     3 N
                                                     , RL
              , SAVE , SHAPE , SMALLT, T
                                                             , V
                                                                               , UBG
     4 S
                                             , TE
                                                                      , WT
                                                                                       16
                                            ,SPARE
              , XE
                      • Z
                              ,ZBFR
                                     ,ZLHT
                                                                                DBG
                                                                                       17
      COMMON /CONTRL/ CETIC(12), IC(2G), IRAD, IRISE, ISIN, ISOUT, JPARN, KDI
                                                                                DBG
      COMMON /PARTCL/ NDSTR,RHOP, DMEAN, SO, PS(2(0), DIAM(201), FMASS(20L)
                                                                                DBG
                                                                                       19
      COMMON /TABLES/ MCX, CX(50,10), GDPST(13,100)
                                                                                D3G
                                                                                       20
C
                                                                                DBG
                                                                                       21
      DIMENSION Y(200),CG(200)
                                                                                03G
                                                                                       22
      EQUIVALENCE (Y(1), GCPST(1)), (CG(1), GDPST(201))
                                                                                D8G
                                                                                       23
                                                                                03G
                                                                                       24
  016 FORMAT (1H0 /
                                                                                08G
                                                                                       25
     1 3X1P9E13.4 /
                                                                                DBG
                                                                                       26
        (10X1H*, 5X8E13.4))
                                                                                DBG
                                                                                       27
   17 FORMAT(21X,*PS*,11X,*CG*,11X,*Y*,11X,*PS*,11X,*CG*,11X,*Y*/16X,1P6DBG
                                                                                       28
     1E13.4)
                                                                                       29
  099 FORMAT (1HD / 49X17+CLOU[ DEBUG PRINT //
                                                                                DBG
                                                                                       30
        9X2HST, 11X1HU, 12X1HX, 12X1HT, 12X1HR, 12X1HZ, 12X2HEK,
                                                                                       31
                                                                                DBG
         11X1HV, 12X2HWT / 10X1H*, 11X2HTE, 11X2HRM, 11X2HES,
                                                                                       32
         11X1HP, 12X2HPW, 11X2HED, 10X3HRLH, 11X1HS/
                                                                                DBG
                                                                                       33
         10X1H*, 18X3HEPS, 10X3HRZT, 9X4HCMLR,///)
                                                                                UBG
                                                                                       34
                                                                                03G
                                                                                       35
                                                                                ₽ DBG
                                                                                       36
                                                                                D3 G
                                                                                       37
      IF (AMOD (SMALLT, 13.0)) 2146, 1149, 2146
                                                                                08G
                                                                                       38
 1149 WRITE (ISOUT,99)
                                                                                DBG
                                                                                       39
                                                                                08 G
 2146 IF (SMALLT) 1146, 1146, 3146
                                                                                       40
 3146 IF (SMALLT-AINT (SMALL 7)) 149,4146,149
                                                                                08 G
                                                                                       41
                                                                                03G
                                                                                       42
 4146 IF (AMOD (SMALLT, 2.0))1146,149,1146
 1146 WRITE (ISOUT, 16)
                                                                                DBG
                                                                                       43
                                                                                DBG
         SMALLT, U. X, T. P. Z, EK, V, WT,
                                                                                       44
         TE, RM, ES, P, PW, EC, HLR, S,
                                                                                DBG
                                                                                       45
         EPS, RZT , CHLR
                                                                                DBG
                                                                                       46
                                                                                DBG
                                                                                       47
       WRITE(ISOUT,17)
         (PS (I), CG (I), Y (I),
                                                                                UBG
                                                                                       48
         PS (I + 1), GG(I + 1), Y(I + 1),
                                                                                DRC
                                                                                       49
                                                                                 D3G
                                                                                       50
      3 I=1, NDSTR, 2)
  149 RETURN
                                                                                 D 3 G
                                                                                       51
                                                                                936
       FNJ
```

```
* DECK. DOSA
                                                                                DC 5N
      SUBROUTINE DOSN
                                                                                DUSN
                                                                                         2
                                                                                OCSN
                                                                                         3
C
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                                DCSN
                                                                                DCSN
                                                                                         5
                                                                                *DCSN
                                                                                         6
                                                                                         7
C
                                                                                DCSN
      DOSN DETERMINES AT THE END OF EACH TIME STEP WHETHER TO
                                                                                DCSN
                                                                                         8
      CONTINUE THE CRM COMPUTATION
                                                                                DCSN
                                                                                         9
C
                                                                                DCSN
                                                                                       10
                                                                                *DCSN
                                                                                       11
                                                                                DCSN
                                                                                       12
                                              , C3
                                                                       .ORM
                                                      , C6
      COMMON /CLOUD/ CHANGE, CHLR
                                      , C2
                                                             , DEK
                                                                               . DCSN
                                                                                       13
     1 DS
              ,OST
                      .DSTO .DST1
                                      , DST2
                                              . DT
                                                      , DU
                                                             , DWT
                                                                      , OX
                                                                               , DCSN
                                                                                       14
                              , EPS
              , E0
                                      ,ES
                                              , HLR
     2 0%
                      ,EK
                                                      , KS
                                                             . KSV
                                                                       . MWYA
                                                                               . DCSN
                                                                                       15
                      • P
     3 N
              , NNN
                              .PW
                                              , RA
                                                      , RL
                                                                               , DCSN
                                      •R
                                                              , RM
                                                                       ,RZT
                                                                                       16
                                              , TE
     4 S
              .SAVE
                      .SHAPE .SMALLT.T
                                                      , U
                                                              , V
                                                                       . WT
                                                                               DCSN
                                                                                       17
     5 X
              ,XE
                              .ZBFR .ZLMT .SPARE
                      ٠Z
                                                                                 DCSN
                                                                                       18
      COMMON /CONTRL/ DETID(12), IC(20), IRAD, IRISE, ISIA, ISOUT, JPARN, KDI
                                                                                DCSN
                                                                                       19
                                                                                DCSN
                                                                                       20
                                                                                       21
  066 FORMAT (14HOSWITCH TO DRY)
                                                                                DCSN
                                                                                 DCSN
  077 FORMAT (14HOSWITCH TO WET)
                                                                                       22
  088 FORMAT(1H1, 9X, 46HCLOUD RISE IS TERMINATED IN DCSN AT STATEMENT IDCSN
                                                                                        23
     14. 8H BY THE AG. 7H SWITCH///)
                                                                                 DC SN
                                                                                        24
                                                                                 DUSN
                                                                                       25
C
      DATA WORD1,
                          WORC3, W (RO4 /6H TEMP ,
                                                            6H ZLMT . 6HR.LT. 1/DCSN
                                                                                        26
                                                                                 DC SN
                                                                                       27
                                                                  28
                                                                                 DC SN
                                                                                        29
C
      GO TO (151,154,1531),N
                                                                                 DCSN
                                                                                        30
                                                                                DCSN
                                                                                        31
C
       SHOULD WE SWITCH TO WET MODE ---
                                                                                 DCSN
                                                                                        32
C
               YES-- TO 041
                                                                                 DC SN
                                                                                        33
                                                                                 DCSN
                                                                                        34
 1531 IF (ES-PW) 041, 041, 008
                                                                                 DCSN
                                                                                        35
C
                                                                                 DCSN
                                                                                        36
                                                                                 DC SN
                                                                                       37
  041
      N=2
      IF(IC(5))151,151,1041
                                                                                 DCSN
                                                                                       38
 1041 WRITE(ISOUT,77)
                                                                                 DCSN
                                                                                        39
       GO TO 151
                                                                                 DCSN
                                                                                       40
                                                                                 DCSN
                                                                                        41
C 154 SHOULD WE SWITCH TO DRY MODE-
                                                                                 DCSN
                                                                                        42
                                                                                 DCSN
        NO TO 151
                                                                                        43
                                                                                 DCSN
                                                                                        44
  154 IF (WT + 1.0E-8) 153,153,151
                                                                                 DCSN
                                                                                        45
  153 N=1
                                                                                 DC SN
                                                                                        46
      WT=0.
                                                                                 DCSN
                                                                                        47
                                                                                 DC SN
      DWT=0.
                                                                                        48
      IF(IC(5))151,151,152
                                                                                 DCSN
                                                                                        49
  152 WRITE (ISOUT, 66)
                                                                                 DCSN
                                                                                        50
                                                                                 DOSN
                                                                                        51
C
      TEST FOR TIME STEP CHANGE
                                                                                 DCSN
С
                                                                                 DCSN
                                                                                        53
                                                                                 DCSN
  151 IF (SMALLT - CHANGE) 014, 015, 015
                                                                                 DC SN
  C15 DST=DST2
                                                                                        55
                                                                                 DC SN
                                                                                        56
       TEST FOR ANOMALOUS CLOUD RISE AND SET UP TERMINATION CONDITION IF DOSN
                                                                                        57
C
                                                                                 DC SN
                                                                                        58
C
       ANDMALY IS FLUND
                                                                                 UCSN
```

```
DC SN
C
                                                                                        ó1
                                                                                 DCSN
                                                                                        62
                                                                                 DC:SN
  014 IF (ABS(T)-10.) 114, 20, 20
                                                                                        63
  114 NSTAT=14
                                                                                 DCSN
                                                                                        64
      WORD=WORD1
                                                                                 DCSN
                                                                                        65
      GO TO 1
                                                                                 DCSN
                                                                                        66
                                                                                 DCSN
                                                                                        67
Ç
                                                                                 DCSN
C
      TEST FOR R.LT.1 ANCHALY
                                                                                        68
                                                                                 DCSN
                                                                                        69
                                                                                 DCSN
                                                                                        70
  029 IF(R-1.) 125.13.13
                                                                                 DCSN
                                                                                        71
  120 NSTAT=20
                                                                                 DCSN
                                                                                        72
       WORD=WORD4
      GO TO 1
                                                                                 DCSN
                                                                                        73
С
                                                                                 DCSN
                                                                                        74
C
                                                                                 DCSN
                                                                                        75
      TEST FOR ZLMT ANOMALY
C
                                                                                 DCSN
                                                                                        76
  013 IF (Z - ZLMF) 008, 088, 113
                                                                                 DCSN
                                                                                        77
  113 NSTAT=13
                                                                                 DCSN
                                                                                        78
                                                                                 DCSN
                                                                                        79
       WORD=WORD3
                                               COMPLETE CX TABLE
                                                                                 DC SN
                                                                                        80
                                                                                 DC2N
  001 \text{ MWYA} = 3
                                                                                        81
       WRITE(ISOUT, 88) NSTAT, WORD
                                                                                 DCSN
                                                                                        82
  008 RETURN
                                                                                 DCSN
                                                                                        83
       END
                                                                                 DCSN
                                                                                        84
```

```
*DECK, DERIV
                                                                           DERIV
      SUBROUTINE DERIV
                                                                           DERIV
C
C
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
C
C
      COMPUTES DIFFERENTIALS OF THE GLOUD PROPERTIES IN PREPARATION FOR DERIV
C
      INTEGRATION OVER A TIME STEP
                                                                           DERIV
C
                                                                           DERIV 10
                                                                    ******DERIV 11
C
                                                                           DERIV 12
C
       COMMON /ATMOS/ NAT, ALT (256), ATP (256), PRS (256), RLH (256),
                                                                           DERIV 13
              RHO(256), ETA(256), NHODO, ZV(130), VX(130), VY(130)
                                                                           DERIV 14
                                                       ,DEK
                                                                  , ORM
                                                                          DERIV 15
                                          ,C3 ,C6
      COMMON /CLOUD/ CHANGE, CMLR , CZ
                                                 , 00
                                                         , DWT
                                                                  • 0 X
                                                                          DERIV 16
                     DSTO DST1
                                  ,OST2 ,OT
             , DS T
                                   ,ES
                                                  , KS
                                                         ,KSV
                                                                  . HWYA
                                                                          , DERIV 17
                    ,EK
                            ,EPS
                                           , HLF.
     2 DZ
             , ED
                            ,PW
                                           , RA
                                                  , RL
                                                                  , RZT
                                                                          .DERIV 18
                     • P
                                                         , RM
     3 N
             , NNN
                                   ٠,٦
                                           , TE
                                                                          DERIV 19
             ,SAVE
                     ,SHAPE ,SMALLT,T
                                                  • U
                                                         , V
                                                                  , WT
     4 S
             , XE
                     , Z
                            ,ZBFR ,ZLMT ,SPARE
                                                                           DERIV 20
      COMMON /INITL/ F, PHI, SSAM, THE, THPG, THPS, VPR
                                                                           DERIV 21
C
C
С
                                                                            DERIV 24
                                                                           DERIV 25
      DZ=U
                                                                            DEKIV 26
      DATATH VALUES OF AMMIENT TEMPERATURE, FRESHURE FRELATIVE HUMIDITY CERTY IS
C
                                                                            CERIV 29
                                                                            5241V 36
      DALL TROL(Z,NAT ,ALT,A)P,T1)
                                                                            OCOTH 24
      CALL TRPLIZENAT . ALT.PRS.P3
```

```
DERIV 32
      CALL TRPL(Z,NAT ,ALT,RLH,HLR)
                                                                           DERIV 33
                                                                            DERIV 34
C
      COMPUTE AMBIENT AIR WATER MIXING RATIO
                                                                           DERIV 35
                                                                           DERIV 36
C
      XE=109.98+HLR+(TE/27:)++(-5.13)+EXP((25.+(TE-27:))/TE)/(P+29.)
                                                                           DERIV 37
                                                                           DERIV 38
      TAD=0.
                                                                            DERIV 39
C
      COMPUTE SPECIFIC HEAT OF IN-CLOUD AIR
C
                                                                            DERIV 40
                                                                           DERIV 41
      IF(T-2300.)15,15,16
                                                                            DERIV 42
   15 TPR=T
                                                                            DERIV 43
      CP=946.6+0.1971*T
                                                                           DERIV 44
      GO TO 17
                                                                           DERIV 45
   16 TPR=2300.
                                                                           DERIV 46
      TAD=-3587.5*(T-TPR)+1.0625*(T**2-TPR**2)
                                                                           DERIV 47
                                                                           DERIV 48
      CP=-3567.5+2.125*T
   17 CP=(CP+X*(1697.66+1.144174*T))/(1.+X)
                                                                           DERIV 49
      CPAI=TAD+946.6+(TPR-TE)+(.09855+{TPR++2-TE++2)
                                                                           DERIV 50
C
                                                                           DERIV 51
C
      COMPUTE SPECIFIC HEAT OF IN-CLOUD AIR-WATER-SOIL MIXTURE
                                                                            DERIV 52
                                                                            DERIV 53
      RMIX=(1.+X)/(1.+X+S+WY)
                                                                            DERIV 54
      CR=CP*RMIX
                                                                           DERIV 55
                                                                           DERIV 56
      IF (THPS-T) 380, 381, 381
  381 IF(T-848.) 3810, 3810, 3811
                                                                           DERIV 57
                                                                           DERIV 58
 3810 CS=781.6+0.5612*T-1.881E7/T**2
      GO TO 3812
                                                                           DERIV 59
 3811 CS=1003.8+0.13510*T
                                                                           DERIV 60
 3812 CR=CR+CS*(S+WT)/(1.+X+S+HT)
                                                                            DERIV 61
  380 QXE=(1.+XE)/(1.+29.*XE/18.)
                                                                            DERIV 62
      QX = (1. + 29. + X/18.)/(1.+X)
                                                                            DERIV 63
      QT=T/TE
                                                                            DERIV 64
C
                                                                            DERI V 65
      COMPUTE HORIZONTAL RADIUS OF CLOUD
                                                                            DERIV 66
                                                                            DERIV 67
C
                                                                            DERIV 68
      R=SQRT(3.*V/(RZT*12.5663706E0))
C
                                                                            DERIV 69
      IS CLOUD CENTER ALTITUDE GREATER OR LESS THAN ALTITUDE OF PREVIOUSDERIV 70
C
С
      TIME STEP
                                                                            DERIV 71
C
         GREATER- TO 1101
                                                                            DERIV 72
         LESS - TO 1100
                                                                            DERIV 73
      IF(KS,GT.0)GO TO 1102
                                                                            DERIV 74
      IF (Z-ZBFR) 1100, 1101, 1101
                                                                            DERIV 75
 1100 DZ= J.
                                                                            DERIV 76
      U=0.
                                                                            DERIV 77
      DU=0.
                                                                            DERIV 78
      NNN=S
                                                                            DERIV 79
      GO TO 1132
                                                                            DERIV 30
 11U1 NNN=1
                                                                            DERIV 81
C
                                                                            DERIV 62
      COMPUTE CLOUD S TO VOLUME RATIO
                                                                            DERIV 33
C
                                                                            DERIV 64
 1102 SV=12.5603736*K**2/V
                                                                            DEGIV 35
                                                                            DEFIV 36
C
      COMPUTE TURBULENT KINETIC ENERGY DISSIPATION RATE
С
                                                                            DEKIV 67
C
                                                                            DERIV 88
      EPS=C3*(2. *EK; **1. 5/RZT
                                                                            UERIV 89
      Q7=AMAX1 (ABS(U).SQRT(2.*EK))
                                                                            DERIV 96
      QQ=QT+QX+QXE+(1.+X+WT)/(1.+X+S+WT)
                                                                            DERIV 31
```

《《文·》 说话还在自己的话是话,我们就是我们的话,我们就是我们的话,我们就会会说。

```
DERIV 92
      IF (NHODO) 1103, 1103, 1104
 1103 VS=0.U
                                                                             DERIV 33
      GO TO 1105
                                                                             DERIV 54
C
                                                                             DERIV 95
C
      COMPUTE WIND SHEAR CIRRECTION FACTOR
                                                                             DERIV 96
                                                                             DERIV 97
 1104 ZTP=Z+RZT
                                                                             DERIV 58
                                                                             DERIV 39
      ZBT=Z-RZT
      CALL TRPL(ZTP, NHODO, ZV, VX, VXT)
                                                                             DERIV110
      CALL TRPL(ZTP, NHODO, ZV, VY, VYT)
                                                                             DERIV1(1
      CALL TRPL(ZBT, NHODO, ZV, VX, VXB)
                                                                             DERIV102
                                                                             DERIV133
      CALL TRPL(ZBT, NHODO, ZV, VY, VYB)
      VS=SQRT ((VXT-VXB) ** 2 + (VYT-VYB) ** 2)
                                                                             DERIV104
 1105 RS=SV*Q7+1.5*C6*VS/R
                                                                             DERIVA(5
      GO TO (100,101,100),N
                                                                             DERIV116
C
                                                                             DERIV117
                                                                             DERIV1J8
C
      DRY EQUATIONS
С
                                                                             DERIV109
C
                                                                             DERIV110
                                                                             DERIV111
C
      COMPUTE AIR ENTRAINMENT RATE
                                                                             DERIV112
  100 ORM=(RM/(1.-CPAI/(CP*T*QX)))*RMIX*(RS
                                                 *RL+(QT+GX+QXE+9.8+U~EPS)+DERIV113
     1RMIX/(CR*T*QX)-9.8*U/(287./QXE*TE))
                                                                             DERIV114
      DRME = DRM
                                                                             DERIV115
C
                                                                             DERIV116
C
      SUBTRACT AWAY RATE OF MASS LOST QUE TO PARTICLES FALLING OUT CLOUDDERIV117
C
      BOTTOM DURING RISE
                                                                             DEKIV118
                                                                             DERIV119
C
      DRM=DRM-CMLR
                                                                             DERIV120
C
                                                                             DERIV121
C
      COMPUTE TIME DERIVATIVE OF WATER VAPOR MIXING RATIO
                                                                             DEPIV122
C
                                                                             DER1 1123
      DX=-(1.+X+S)/(1.+XE)*(X-XE)*DRME/RM
                                                                             DERIV124
                                                                             DERIV125
Ç
Ç
                                                                             DERIV126
      COMPUTE TIME DERIVATIVE OF CLOUD TEMPERATURE
C
                                                                             DERIV127
      DT=-(RMIX*(QT*QX*QXE*9.8*U-EPS)+C*AI*DRME/RM)/CR
                                                                             DERIV128
      WT=G.
                                                                             DERIV129
C
                                                                             DERIV130
C
      NO CHANGE IN LIQUID WATER HIXING RATIO
                                                                             DERIV131
C
                                                                             DERIV132
      DWT=3.
                                                                             DERIV133
      GO TO 555
                                                                             DERIV134
                                                                             UERIV135
C
C
      WET EQUATIONS
                                                                             DERIV136
                                                                             DEK1 V137
                                                                             DERIV138
  101 Q1≈1.+X*29./18.
                                                                             DERIV139
       TF(T-273.) 102,103,103
                                                                             DERIVIAD
  102 CL=2.83E6
                                                                             DEPIVIAL
       GO TO 104
                                                                             DERIV142
  103 CL=2.516
  384 02=CL*X/(287.*T)
                                                                             DEKIV143
                                                                             DERIV144
       03=18.*02/29./1
       Q4=1.+Q2
                                                                             DER 1 1 1 45
       Q5=1.+QL+Q3/CP
                                                                             DERIV146
       Q6=CL+(X-XE)/CP+T-TE
                                                                             DERIV147
       09=RHIX/Q5
                                                                              DEFIV148
       Q8=Q9/T/QX
                                                                             DEKIV149
                                                                              DERIVASO
       COMMENT ATEL PRIVERT BATE
                                                                              DERIV151
```

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C
                                                                           DERIV152
      DRM=RMIX+(RM/(1.0-Q6+Q8))+(RS+RL+(QX+QT+9.8+Q4+U+QXE-EPS)/CP/T/QX+DERIV153
     1Q9-(9.8*U)/(287./QXE*TE))
                                                                           DERIV154
      DRME= DRM
                                                                           DERIV155
C
                                                                           DERIV156
      SUBTRACT AWAY RATE OF MASS LOST QUE TO PARTICLES FALLING OUT CLOUDDERIV157
C
                                                                           DERIV158
С
      BOTTOM DURING RISE
C
                                                                           DERIV159
      ORM=DRM-CMLR
                                                                           DERIV160
C
                                                                           DERIV161
C
      COMPUTE TIME DERIVATIVE OF TEMPERATURE
                                                                           DERIV162
C
                                                                           DERIV163
      DT=((-QX+QT+Q4+9.8+U/CP+QXE-Q6+DRME/(RMIX+RM))+EFS/CF)+Q9
                                                                           DERI V164
С
                                                                           DERIV165
C
      COMPUTE TIME DERIVATIVE OF WATER VAPOR MIXING RATIO
                                                                           DERIV166
C
                                                                           DERIV167
      DX=Q1*(Q3*DT+9.8*X*U/(287.*TE)*QXE)
                                                                           DERIVIES
C
                                                                           DERIV169
C
      COMPUTE TIME DERIVATIVE OF LIQUID WATER FIXING RATIO
                                                                           DERIV170
C
                                                                           DERIV171
      DWT=- (1.+X+S+WT) /RM* (WT+X-XE) / (1.+XE) *DRME-DX
                                                                           DERIV172
                                                                           DERIV173
  555 ED1= 2.*C2*Q7*QQ/RZT
                                                                           DERIV174
      GO TO (621,1110),NNN
                                                                           DERIV175
  621 CONTINUE
                                                                           DERI V176
                                                                           DERIV177
      COMPUTE CLOUD VERTICAL ACCELERATION
C
                                                                            DERIV178
C
                                                                            DERIV179
      DU = 9.8 + (QT+QX+QXE+RMIX-1) - (ED1 + DRM/RM) + U
                                                                           DERIV180
C
      COMPUTE EDDY VISCOUS RATE OF LOSS OF KINETIC ENERGY OF RISE
                                                                           DERIV181
                                                                            DERIV182
C
 1110 ED=E01*U**2
                                                                           DERIV183
      COMPUTE TIME DERIVATIVE OF TURBULENT KINETIC ENERGY DENSITY
C
                                                                            DERIV1E4
C
                                                                           DERIV185
      DEK=FD-(EK-0.5*U**2)*DRME/RM-EPS
                                                                            DERIV186
C
                                                                           DERIV187
C
      COMPUTE TIME DERIVATIVE OF SOIL MIXING RATIO
                                                                            DERIV188
                                                                            DERIV189
С
      DS=-(1.+X+S+WT) *S/RM*(CMLR/(S+WT)+DRME/(1.+XE))
                                                                            DERIV190
С
                                                                            DERIV191
      COMPUTE IN-CLOUD GAS DENSITY
                                                                            DERIV192
С
                                                                            DERIV193
C
                                                                            DERIV194
      PA=RM/V*RMIX
      IF (EPS) 312, 302, 911
                                                                            DERIV195
                                                                            DERIV196
  98 2 EPS=1.05-4
                                                                            DERIVIST
  901 RETURN
      CN3
                                                                            DERIV198
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RKGIL
*DECK.RKGILL
                                                                               RKGIL
                                                                                       2
      SUBROUTINE RKGILL
                                                                               RKGIL
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                               RKGIL
                                                                               RKGIL
                                                                               * RKGIL
                                                                                RKGIL
        INTEGRATES THE CLOUD RISE DIFFERENTIAL EQUATIONS VIA THE
                                                                                RKGIL
                                                                                RKGIL
                                                                                       9
        RUNGE-KUTTA-GILL METHOD
C
                                                                                RKGIL 10
                                                                              **RKGIL 11
                                                                                RKGIL 12
C
                                                                                RKGIL 13
       COMMON /ATMOS/ NAT, ALT(256), ATP(256), PRS(256), RLH(256),
                                                                                RKGIL 14
               RHO(256), ETA(256), NHODO, ZV(100), VX(100), VY(100)
                                                                     , DKM
                                                   • C6
                                                            , UEK
                                                                              , RKGIL 15
                                             , C3
      COMMON /CLOUD/ CHANGE, CMLR , CR
                                                            , DWT
                                                     , DU
                                                                               , RKGIL 16
              ,OST
                                             , DT
                                                                      ,DX
                      , DSTO
                              ,DST1
                                     ,OST2
     1 05
                                                                      , MWYA
                                                                               , KKGIL 17
                                                             , KSV
                                                     ,KS
     2 DZ
              ,EO
                              ,EPS
                                     , ES
                                             , HLR
                      ,EK
                                                                      •R ZT
                                                                               , RKGIL 16
                      ,P
                              .PW
                                                             , RM
                                                     , RL
     3 N
              , NNN
                                     , R
                                             , KA
                                                             , V
                                                                      , WT
                                                                               , RKGIL 19
                      , SHAPE , SMALLT, T
              , SAVE
                                             ,TE
                                                     • U
     4 5
                                                                                RKGIL 20
                      ٠Z
                              ,ZBFR ,ZLMT
                                             ,SPARE
              ,XE
     5 X
                                                                                RKGIL 21
C
                                                                                RKGIL 22
      DIMENSION DVBL(8), VEL(8), RKG(8)
                                                                                RKGIL 23
                                                                               *RKGIL 24
                                                                                RKGIL 25
                                                                                RKGIL 26
      H=UST
                                                                                RKGIL 27
      KS = 0
                                                                                RKGIL 28
       KYCL=1
                                                                                RKGIL 29
                                                                                RKGIL 30
       VBL (1) = WT
                                                                                RKGIL 31
       VBL(2) = RM
                                                                                RKGIL 32
       VBL (3)=U
                                                                                RKGIL 33
       V9L (4) = X
                                                                                RKGIL 34
       VBL (5) = T
                                                                                RKGIL 35
       VBL (6) = Z
                                                                                RKGIL 36
       VBL (7) = EK
                                                                                RKGIL 37
       VBL (8) = S
                                                                                RKGIL 38
                                                                                RKGIL 39
    20 CALL DERIV
                                                                                RKGIL 40
       IF(ABS(U).LT. 1.E-10) VBL(3)=0.
                                                                                RKGIL 41
       DV3L(1)=OWT
                                                                                RKGIL 42
       DV3L(2) = DRM
                                                                                RKGIL 43
       DVBL(3) = DU
                                                                                RKGIL 44
       DVBL(4)=DX
                                                                                KKGIL 45
       DVBL(5) = DT
                                                                                RKGIL 46
       DV3L(6)=DZ
                                                                                KKGIL 47
       DV3L(7)=DEK
                                                                                RKGIL 48
       OV3L(8)=05
                                                                                RKGIL 49
С
                                                                                KKGIL 50
       KS=KS+1
                                                                                RKGIL 51
       GO TO (1,3,5,7),KS
                                                                                RKGIL 52
                                                                                KKGIL 53
     1 00 2 J=1,8
                                                                                RKGIL 54
       VBL (J) = VBL (J) + C + 5*H*EVBL (J)
                                                                                RKGIL 55
     2 RKG(J)=DVBL(J)
                                                                                RKGII. 56
       GO TO 16
                                                                                KKGIL 57
     3 DO 4 J=1.8
       VBL (J) = VBL (J) + .29289322* H* (DVBL (J) -RKG (J))
                                                                                RKGIL 58
                                                                                KKGIL 59
     4 FKG(J)=.58576644*OVBL(J)+.1213203~*FKG(J)
                                                                                 RKGIL 60
       GO TO 10
```

```
RKGIL 61
    5 00 6 J=1,8
      VBL (J) = VBL (J) +1. 7071068+ F* (DV9L (J) -RKG (J))
                                                                               RKGIL 62
    6 RKG(J)=3.41421356*DVBL(J)-4.1213203*RKG(J)
                                                                               RKGIL 63
      GO TO 10
                                                                               RKGIL 64
                                                                               RKGIL 65
    7 DO 8 J=1.8
    8 VBL(J) = VBL(J) + . 1666 € 667 * H * (DVBL(J) - 2 . * RKG(J))
                                                                               RKGIL 66
С
                                                                               RKGIL 67
      KYCL=2
                                                                               RKGIL 68
                                                                               RKGIL 69
   10 WT=VBL(1)
      RM=VBL(2)
                                                                               RKGIL 70
                                                                               RKGIL 71
      U=VBL(3)
                                                                               FKGIL 72
      X=VBL(4)
                                                                               RKGIL 73
      T= V9L (5)
                                                                               RKGIL 74
      Z=VBL (6)
      EK=VBL(7)
                                                                               RKGIL 75
                                                                               RKGIL 76
      S=VBL(8)
                                                                               RKGIL 77
      CALL TRPL(Z,NAT ,ALT,PRS,PQR)
      V=287.*T*RM*(1.+X)/PQR/(1.+X+S+HT)*(1.0+X*29./18.)/(1.0+X)
                                                                               KKGIL 78
      IF( U .GT. 0.0 ) RZT = ( 0.2387324 * V * SHAPE *+2 ) *+0.333333333 RKGIL 79
      GO TO(20,30), KYCL
                                                                               RKGIL 80
   30 RETURN
                                                                               RKGIL 81
      END
                                                                               RKGIL 82
```

```
*DECK.RSTR
                                                                                   KSTR
      SUBROUTINE RSTR
                                                                                   RSTR
C
                                                                                   RSTR
                                                                                           3
C
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                                   KSTR
                                                                                           4
C
                                                                                           5
                                                                                   RSTR
C
                                                                                  *RSTR
                                                                                           6
\mathbf{C}
                                                                                   RSTR
                                                                                           7
C
      RSTR PRESERVES AND/OR RESTORES CRM VARIABLES
                                                                                   RSTR
                                                                                           8
C
                                                                                   RSTR
                                                                                           9
                                                                                 **RSTR
                                                                                          10
                                                                                   KSTR
                                                                                          11
      COMMON /CLOUD/ CHANGE, CMLR , C2
                                                       ,06
                                                               , DEK
                                                                                  , RSTR
                                               , C3
                                                                        , DRM
                                                                                          12
               .DST
                                                               . CWT
                                                                                  , RSTR
                       ,DSTO ,DST1
                                      ,DST2
                                               . DT
                                                       , DU
                                                                        , DX
                                                                                          13
                                                               , KS V
      2 02
               , ED
                       ,EK
                               , EPS
                                       ,ES
                                               HLF.
                                                       , KS
                                                                        , MWYA
                                                                                  , KSTR
                                                                                          14
                       , P
               , NNN
                               .PW
                                               , RA
                                                       , RL
                                                               , RM
                                                                         , RZT
                                                                                          15
      3 N
                                       , R
                                                                                  , KSTR
                                                                                  , RSTR
               ,SAVE ,SHAPE ,SMALLT,T
                                               * TE
                                                               , V
      4 $
                                                       • U
                                                                         , W T
                                                                                          16
               , XE
                      , Z
                               ,ZBFR ,ZLMT
                                               , SPARE
                                                                                   KSTR
                                                                                          17
       COMMON /PARTCL/ NOSTR,RHOP, DMEAN, SD, PS (200), UI AM (2 u1), FMASS (230)
                                                                                   KSTR
                                                                                          18
                                                                                   RSTR
       COMMON /TABLES/ MCX, CX(50,10), GDPST(1J,1J0)
                                                                                          19
                                                                                   RSTR
С
                                                                                          20
                                                                                   KSTR
       DIMENSION PY(200), Y(200)
                                                                                          21
       EQUIVALENCE (Y(1), GOPST(1)), (PY(1), GOPST(401))
                                                                                   RSTR
                                                                                          22
                                                                                   KSIR
                                                                                          23
                                                                                 **RSTR
                                                                                          24
C
                                                                                   RSTR
                                                                                          25
       GO TO (1,3), KSV
                                                                                   RSTR
                                                                                          26
    1 PEK≈EK
                                                                                   KSTR
                                                                                          27
                                                                                   KSTR
       PRM=RM
                                                                                          28
       PSS=S
                                                                                   RSTR
                                                                                          29
                                                                                   ≺STR
                                                                                          30
       PT=T
       PU=U
                                                                                   KSTR
                                                                                          31
       PV=V
                                                                                   RSTR
                                                                                          32
       PWT=WT
                                                                                   KSTR
                                                                                          33
```

```
PX = X
                                                                                    KSTR
                                                                                           34
       PZ=Z
                                                                                    RSTR
                                                                                           35
       PRZT=RZT
                                                                                    RSTR
                                                                                           36
       DO 2 NP=1.NDSTR
                                                                                    RSTR
                                                                                           37
    2 PY(NP) = Y(NP)
                                                                                    RSTR
                                                                                           38
       GO TO 5
                                                                                    RSTR
                                                                                           39
C
                                                                                    RSTR
                                                                                           40
    3 SMALLT=SMALLT-DST
                                                                                    KSTR
                                                                                           41
       DST = DST1
                                                                                    RSTR
                                                                                           42
       EK=PEK
                                                                                    RSTR
                                                                                           43
       RM=PRM
                                                                                    RSTR
                                                                                           44
       S=PSS
                                                                                    RSTR
                                                                                           45
       T=PT
                                                                                    RSTR
                                                                                           46
       U=PU
                                                                                    RSTR
                                                                                           47
       V=PV
                                                                                    RSTR
                                                                                           48
       WT=PWT
                                                                                    RSTR
                                                                                           49
       X=PX
                                                                                    F.STR
                                                                                           50
       Z=PZ
                                                                                    RSTR
                                                                                           51
       RZT=PRZT
                                                                                    RSTR
                                                                                           52
       DO 4 NP=1, NDSTR
                                                                                    RSTR
                                                                                           53
    4 Y(NP) = PY(NP)
                                                                                    KSTR
                                                                                           54
       N= 3
                                                                                    RSTR
                                                                                           55
    5 RETURN
                                                                                    RSTR
                                                                                           56
       END
                                                                                    RSTR
                                                                                           57
```

```
* DECK + RSXP
                                                                             RSXP
      SUBROUTINE RSXP
                                                                             RS.(P
                                                                                    2
C
                                                                             RSXP
C
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                             KSXP
                                                                                    4
C
                                                                             RSXP
                                                                                     5
C
                                                                           ** KSXP
                                                                                    6
C
                                                                             KSXP
                                                                                    7
C
      AFTER THE DYNAMIC CLOUD RISE HAS BEEN COMPLETED. RSXP PASSES
                                                                             RSXP
                                                                                    8
      THROUGH THE RISE HISTORY TABLE, CX, TO RESIMULATE THE RISE FOR THERSXP
C
                                                                                    9
C
      PURPOSE OF DEFINING A DISTRUBUTION IN SPACE ABOVE GZ OF FALLOUT
                                                                             RSXP
                                                                                    ij
С
      PARCELS THAT ARE TO BE TRANSPORTED DOWNWIND BY SUBSEQUENT MODULES. RSXP
                                                                                    11
C
      RESULTS ARE WRITTEN ON TAPE IRISE.
                                                                             RSXP
                                                                                    12
C
                                                                             RSXP
                                                                                    13
C
                                                                             RSXP
                                                                                    14
C
      DPST(1,MBT)
                    TIME
                                                                             RSXP
                                                                                    15
C
      DPST(2, MBT)
                    ALTITUCE OF PARCEL
                                           CENTER OF MASS
                                                                             RSXP
                                                                                    16
C
      DPS ((3, MBT)
                    RADIUS
                                                                             RSXP
                                                                                    17
      DPST(4, MBT)
C
                    PARTICLE DIAMETER MICROMETERS
                                                                             RSXP
                                                                                    18
                    MASS OF ACTIVITY FRACTION
C
      DPST(5, MBT)
                                                                             RSXP
                                                                                    19
                    PARCEL THICKNESS
C
      DPST(6, MBT)
                                                                             RSXP
                                                                                    20
C
      DPST(7, MBT)
                    ALTITUCE OF PARCEL BASE
                                                                             KSXP
                                                                                    21
C
      DPST(8, MBT) PARCEL VOLUME
                                                                             RSXP
                                                                                    22
C
                                                                             KSXP
                                                                                    23
C
                                                                             FRSXP
                                                                                    24
C
                                                                             RSXP
                                                                                    25
       COMMON /ATMOS/ NAT, ALT(256), ATP(256), PRS(256), RLH(256),
                                                                             RSXP
                                                                                    26
               RHO(256), ETA(256), NHODO, 27(100), VX(100), VY(100)
                                                                             RSXP
                                                                                    27
      COMMON /BASIC/ W.FW.ZBRSTZ.HEIGHT.JGUL.SLOTMP.TMSD.XGZ.YGZ.TGZ
                                                                             RSXP
                                                                                    28
      CONMON /CONTRL/ DETID(12).IC(20),IRAD,IRISE,ISIN,1SOUT,JPARC,KÜI
                                                                             RSXP
                                                                                    29
      COMMON /INITL/ F, PHI, SSAM, TME, MPG, TMPS, VPR
                                                                             MSAP
                                                                                    3 C
      COMMON /PARTCL/ NDSTF.RHCP.DMEAN.SU.PS (200).DLAM (201).FMASS (200)
                                                                             8 S X P
                                                                                    31
```

```
RSXP
                                                                                     32
      COMMON /TABLES/ MCX, CX(50,10), GDPST(10,100)
                                                                              RSXP
                                                                                     33
C
                                                                              RSXP
      DIMENSION DPST(8,2),CPX(2,50),VISCX(50),PPST(8,10),DNWAF(2)
                                                                                     34
                                                                                     35
                                                                              RSXP
  444 FORMAT(*1*/10X,*DEPOSIT INCREMENTS*//15X,*TIME*,7X,*ALT*,8X,*RAD*,RSXP
                                                                                     36
     17X, #DIAH+,8X, #MASS+,8X, #DZ+,7X, #ZLOH+,7X, #VOL+//)
                                                                              RSXP
                                                                                     37
                                                                              RSXP
                                                                                     38
  666 FORMAT(1X, 1PE11.3.7E11.3, I2, 5X, I2, *IN GLOUD*)
                                                                                     39
  777 FORMAT(1X,1PE11.3,7E11.3,I2,5X,I2)
                                                                              RSXP
  888 FORMAT(1x, 1PE11.3, 7E11.3/1x, *SUBDIVISION*, 2x, 15, 5x, *SIZE CLASS*, 2xRSXP
                                                                                     40
                                                                              RSXP
                                                                                     41
                                                                              RSXP
                                                                                     42
                                                                              *RSXP
                                                                                     43
C
                                                                              RSXP
                                                                                     44
C
       INITIALIZE WAFER UP-CRIFT INTERPOLATION ARRAYS AND WAFER DATA
                                                                              KSXP
                                                                                     45
C
                                                                               RSXP
                                                                                     46
С
      ARRAYS
C
                                                                               RSXP
                                                                                     47
      DO 2 KA=1,50
                                                                               RSXP
                                                                                     48
                                                                               RSXP
                                                                                     49
      DO 2 KB=1,2
                                                                               RSXP
                                                                                     50
    2 DPX (KB, KA) = 0.0
                                                                               RSXP
                                                                                     51
       DO 3 KC=1,8
       DO 3 KQ=1,2
                                                                               RSXP
                                                                                     52
                                                                               RSXP
                                                                                     53
    3 DPST(KC,KQ)=U.0
    4 KDPST=KDI
                                                                               RSXP
                                                                                     54
       DPSTK=KDPST
                                                                               RSXP
                                                                                     55
                                                                               RS XP
                                                                                     56
      COMPUTE WAFER UP-DRIFT INTERPOLATION ARRAYS
                                                                               RSXP
                                                                                     57
C
                                                                               RSXP
                                                                                     58
                                                                               RSXP
    6 DO 7 KD=1.MCX
                                                                                     59
       IF(CX(KD,7)-CX(KD, ())53, 53, 54
                                                                               RSXP
                                                                                     60
                                                                               RSXP
                                                                                     61
   53 DPX(1,KD)=0.C
                                                                               RSXP
       GO TO 55
                                                                                     62
                                                                               RSXP
   54 DPX(1,KO) = (CX(KD,7) - CX(KD,6))/(CX(KD,4) - CX(KD,3))
                                                                                     63
                                                                               KSXP
   55 IF (CX(KD,6))56,56,57
                                                                                     64
                                                                               RSXP
                                                                                     65
   56 DPX (2.KD)= 0.0
                                                                               RSXP
                                                                                     66
       GO TO 7
                                                                               RSXP
   57 DENOM=CX(KD.3)-ZBRSTZ
                                                                                     67
                                                                               RSXP
                                                                                     68
       IF (DENOM) 58,56,58
                                                                               RSXP
                                                                                     69
   58 DPX(2,KD)=CX(KD,6)/DENOM
                                                                               RSXP
                                                                                     70
    7 CONTINUE
                                                                               RSXP
       IF(IC(6) .GT. D) WRITE(ISOUT,444)
                                                                                     71
                                                                               RSXP
                                                                                     72
       SET NOMINAL WAFER EDGE LENGTH IF WAFER RADII ARE TO BE SUBDIVIDED RSXP
                                                                                     73
C
                                                                               RSXP
                                                                                     74
С
                                                                               RSXP
                                                                                     75
       IF(IRAD)78,78,79
                                                                               KSXP
                                                                                     76
   78 87=0.
                                                                               RSXP
                                                                                      77
       GO TO 77
                                                                               RSXP
                                                                                     78
   79 BZ=CX(MCX,5)/FLOAT(IRAD)
       INITIALIZE TAPE IRISE
                                                                               RSXP
                                                                                      79
                                                                               RSXP
                                                                                     Ö 0
   77 REWIND IRISE
                                                                               RSXP
                                                                                      81
 7882 BZZ=BZ/2.0
                                                                               RSXP
                                                                                      82
  120 LODD=0
                                                                               RSXP
                                                                                      83
C
                                                                               RSXP
       COMPUTE IN-CLOUD AIR VISCOSITIES
                                                                                      84
C
                                                                               RSXP
                                                                                      85
C
                                                                               RSXP
                                                                                      85
       00 6345 J=1.MCX
 6C45 VISCX(J)=1.458E-6*CX(J,9)**1.5/(110.44CX(J,9))
                                                                               RSXP
                                                                                      87
                                                                               RSXP
                                                                                      08
       KCX=MCX-1
                                                                               RSXP
                                                                                      89
С
       COMPUTE A SETTLING RATE THRESHOLD, SRTHS. SETTLING RATES LESS
                                                                               RSXP
                                                                                      90
C
       THAN THIS VALUE ARE CONSIDERED INSIGNIFICANT AND ARE REPLACED
                                                                               KSXP
C
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WITH ZERO.
                                                                            RSXP
                                                                                   92
C
                                                                             RSXP
                                                                                   93
      SRTHS = J.1 * ( CX( MCX,4 ) - CX( MCX,3 ))/DFSTK/600.
                                                                             RSXP
                                                                                   94
                                                                             RSXP
                                                                                   95
      ENTER OUTSIDE WAFER CALCULATION LOOP. THIS LCOF DEFINES PARTICLE RSXP
                                                                                   96
      SIZE CLASSES.
                                                                                   97
                                                                             RSXP
C
                                                                             RSXP
                                                                                   98
  200 DO 278 MA=1,NDSTR
                                                                             RSXP
                                                                                   99
      KDPS=2*KDPST
                                                                             RSXP 1J0
C
                                                                             RSXP 101
C
                                                                             KSXP 102
      ENTER MIDDLE WAFER CALCULATION LOOP. THIS LOOP CEFINES CLOUD
C
                                                                             RSXP 103
C
      WAFER SUBDIVISIONS.
                                                                             RSXP 114
C
                                                                             RSXP 105
      DO 258 MB=1,KDPS
                                                                             RSXP 106
C
                                                                             RSXP 117
      COMPUTE WAFER TOP OR BOTTOM INDICATOR, MBT
C
                                                                             RSXP 138
C
          IF MB IS ODD, MET=2
                                      THIS SPECIFIES A WAFER BOTTOM
                                                                             RSXP 109
C
          IF MB IS EVEN, MET=1
                                      THIS SPECIFIES A WAFER TOP
                                                                             RSXP 118
C
                                                                             RSXP 111
      MBT = 2*((MB+1)/2) - MB+1
                                                                             RSXP 112
C
                                                                             RSXP 113
      INITIAL DPST VARIABLES
                                                                             RSXP 114
C
                                                                             RSXP 115
      DPST(1.MBT) = CX(1.1)
                                                                             RSXP 116
      DPST(3, MBT)=CX(MCX,5)
                                                                             RSXP 117
      GO TO (202, 201), MBT
                                                                             RSXP 118
  201 DPST(4, MBT ) = DIAM(MA)
                                                                             RSXP 119
      GO TO 233
                                                                             RSXP 120
  202 DPST (4, MBT) =D TAM (MA+1)
                                                                             RSXP 121
  203 DPST(5, MBT) = FMASS(MA)/DPSTK
                                                                             RSXP
                                                                                 122
      IF(SD .GT. 0.C)DPST(5,MBT)=DPST(5,MBT)*SSAM
                                                                             RSXP 123
      BM=M3/2
                                                                             RSXP 124
      OPST(2 ,MBT)=CX(1,3)+(CX(1,4)-CX(1,3))/KDI*BM
                                                                             RSXP 125
      ZLST=DPST(2, MBT)
                                                                             RSXP 126
      KBASE=1
                                                                             RSXP 127
      JSASE=1
                                                                             RSXP 128
                                                                             RSXP 129
      ENTER INSIDE WAFER CALCULATION LOOP. THIS LOOP DEFINES CLOUD
                                                                             RSXP 130
      PISE HISTORY TIMES IN THE CX ARRAY
                                                                             RSXP 131
C
                                                                             RSXP 132
C
                                                                             RSXP 133
C
      COMPUTE OPST TRAVEL
                                                                             RSXP 134
C
                                                                             RSXP 135
      DO 238 MC=1.KCX
                                                                             RSXP 136
      ZVSB=DPST( 2,MBT)-Cx(MC, 3)
                                                                             RSXP 137
                             .1 ) ZVSB = 0.0
      IF ( ABS ( ZVSB ) .LT.
                                                                             RSXP 138
      IF(ZVSB)204,210,210
                                                                             RSXP 139
  204 GO TO (236,208), KBASE
                                                                             RSXP 140
C
                                                                             RSXP 141
С
      ADJUST DPST RADIUS AND ALTITUDE FOR LEAVING CLOUD
                                                                             KSXP 142
C
                                                                             RSXP 143
  206 KBASE=2
                                                                             RSXP 144
      MD=MC-1
                                                                             RSXP 145
  207 EXTM=(ZLST-CX(MD.3))/(CX(MD.6)-UP+DN)
                                                                             RSXP 146
 1207 OPST(3, MBT) = CX(MO,5) + EXTM*CX(MO,8)
                                                                             RSXP 147
      DPST( 2.MBT)=ZLST+(UF-CN)*EXTM
                                                                             RSXP 148
C
                                                                             KSXP 149
                                                                             RSXP 150
C
      IF THE MAFER IS ON THE GROUND, JUMP THE INNER LCCP. IF NOT,
      COMPUTE THE POSITION OF THE WAFER BELOW THE CLOUD BASE.
                                                                             RSXP 151
```

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C
                                                                              RSXP 152
      GO TO (1208,233), JBASE
                                                                              RSXP 153
 1208 DPST( 2,MBT)=DPST( 2,MBT)+(CX(HQ,6)-DN)+(CX(MD,2)-EXTM)
                                                                              RSXP 154
C
                                                                              RSXP 155
C
      COMPUTE BELOW CLOUD AIR DENSITY , VISCOSITY AND TEMPERATURE
                                                                              RSXP
                                                                                   156
                                                                              RSXP 157
  208 UP=CX(MC,6)+ZVSB*DPX(2,MC)
                                                                              RSXP 158
      CALL TRPL(OPST( 2,MeT),NAT ,ALT,RHO,DEN)
                                                                              RSXP 159
      CALL TRPL(OPST( 2, MET), NAT , ALT, ETA, VIS)
                                                                              RSXP 160
                                                                              RSXP 161
      CALL TRPL(DPST( 2, MBT), NAT ; ALT, ATP, THP)
      GO TO 212
                                                                              RSXP 162
£
                                                                              RSXP 163
C
      COMPUTE INSIDE CLOUD GAS DENSITY, VISCOSITY AND TEMPERATURE
                                                                              RSXP 164
C
                                                                              RSXP 165
  210 UP=CX(4C,6)+ZVSB*DPX(1,HC)
                                                                              RSXP 166
      FC = (DPST(1, HBT) - CX(HC, 1))/(CX(HC+1, 1) + CX(HC, 1))
                                                                              RSXP 167
                                                                              RSXP 168
      DEN=CX(MC, 10)+(CX(MC+1, 10)-CX(MC, 10))*FC
      VIS=VISCX(MC)+(VISCX(MC+1)+VISCX(MC))*FC
                                                                              RSXP 169
      TMP=CX( MC,9)+(CX( MC+1,9)-CX( MC,9))*FC
                                                                              RSXP 170
C
                                                                              RSXP 171
C
      COMPUTE FALL SPEEDS
                                                                              RSXP 172
C
                                                                              RSXP 173
  212 CALL TRPL(OPST( 2,MET),NAT ,ALT,PRS,P)
                                                                              RSXP 174
      CALL SETTLE (DPST (4, MET), RHOP, DEN, VIS, TMP, P, DN, IACCR)
                                                                              RSXP 175
                                                                              RSXP 176
      IF( DN \cdot LT \cdot SRTHS ) DN = 0.0
      ZNXT=DPST( 2,M8T)+GX(MC,2)*(UP-DN)
                                                                              RSXP 177
C
                                                                              RSXP 178
С
      HAS THE PARTICLE REACHED THE GROUND-
                                                                              RSXP 179
C
           YES TO 220
                                                                              RSXP 180
C
                                                                              RSXP 181
          NO TO 230
                                                                              RSXP 182
C
                                                                              RSXP 183
      IF (ZNXT-ZBRSTZ) 220, 220, 230
C
                                                                              RSXP 184
C
      COMPUTE DEST TIME OF ARRIVAL ON FALLOUT FIELD
                                                                              RSXP 185
                                                                              RS XP 186
                                                                              RSXP 187
  22 C EXTM=(ZBRSTZ-DPST( 2,MBT))/(UP-DN)
                                                                              RSXP 188
      DPST(1, MBT) = DPST(1, MBT) + EXTM
                                                                              RSXP 189
      DPST( 2, MBT) = ZBRSTZ
                                                                              RSXP 190
      DNWAF (MBT) = DN
      JBASE=2
                                                                              RSXP 191
      MD=MC
                                                                              RSXP 192
      GO TO (1207,233), KBASE
                                                                              RSXP 193
  230 DPST(1, MBT) = DPST(1, MBT) + CX(MC, 2)
                                                                              RSXP 194
                                                                              RSXP 195
      ZLST=OPST(2,MBT)
                                                                              RSXP 196
      DPST(2, MBT) = ZNXT
                                                                              RSXP 197
  238 CONTINUE
                                                                              RSXP 138
  233 GO TO (241,2440), MBT
                                                                              KSXP 199
C
       IF BOTH TOP AND BOTTOM HAVE BEEN TREATED, ARE THE TOP AND BOTTOM
                                                                              RSXP 210
C
C
       RADII THE SAME ---
                                                                              RSXP
                                                                                    2:1
C
          YES TO 5448
                                                                              RSXP
                                                                                    2.2
C
          NO TO 2401
                                                                              RSXP 2) *
                                                                              RSXP 234
                                                                              RSXP 245
  241 IF(ABSIDPST(3,1) - CFST(3,2)) .GT. 0.1) GO TO 2441
                                                                              RSXP 2L6
 2440 IFLAG=1
      GO TO (240,256), MBT
                                                                              KSXP 2:7
  240 IF( IC(6) .EQ. 1)
                                                                              RS*P 2:8
                     WRITE(ISOUT, 777) (OPST(Y, HBT), I=1, 8), MBT, IFLAG
                                                                              RSXP 239
     1
      GO TO 5442
                                                                              KS>4 217
                                                                              *SFP 2.1
 2441 IFLAG=2
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RSXP 212
      IF(IC(6))2401,2401,2351
                                                                            RSXP 213
 2351 WRITE(ISOUT, 777) (DFS 1(I, MBT), I=1,8), MBT, IFLAG
                                                                            RSXP 214
 2401 IF (DPST (2,2)-ZBRSTZ) 25 (,259,2448
                                                                            RSXP 215
C
      ADJUST WAFER ALTITUDES IF THEY ARE IMPACTED
C
                                                                            RSXP 216
                                                                            RSXP 217
  259 \text{ DPST}(2,2) = \text{DPST}(2,2) - (CX(MCX,1) - DPST(1,2)) + DNHAF(2)
                                                                            RSXP 218
      IF (DPST (2, 1) - ZBRSTZ) £020,6020,2448
                                                                            RSXP 219
 6020 OPST(2,1)= UPST(2,1) - (CX(MCX,1) - UPST(1,1)) *DNWAF(1)
                                                                            RSXP 220
                                                                            RSXP 221
      DETERMINE PARAMETERS TO BE USED TO SUBDIVIDE A WAFER WHOSE TOP
C
                                                                            RSXP 222
C
      AND BOTTOM HAVE DIFFERENT RADII
                                                                            RSXP 223
 2448 AL DPST (3,1)/DPST (3,2)
                                                                            KSXP 224
                                                                            RSXP 225
      RB=3.1415927*DPST(3.2)*#2
                                                                            P.SXP 226
      KDIP=AL
                                                                            RSXP 227
      IF(KDIP-10)2442,2442,2443
                                                                            RSXP 228
 2443 KDIP=10
      GO TO 2444
                                                                            ⊀SXP 229
                                                                            RSXP 230
 2442 IF(KDIP-2)2450,2444,2444
                                                                            RSXP 231
 2450 IF(AL-1.5)2451,2452,2452
                                                                            RSXP 132
 2451 KDIP=1
                                                                            RSXP 233
      GO TO 2444
                                                                            KSXP 234
 2452 KDIP=2
                                                                            RSXP 235
 2444 ZD=DPST(2,1)-DPST(2,2)
                                                                            RSXP 236
      FK=FLOAT(KDIP)
                                                                            RSXP 237
      DZ=ZO/FK
                                                                            RSXP 238
      ALL=0.5*ZD/ALOG(AL)
C
                                                                            RSXP 239
      SPECIFY PPST ARRAYS FOR THE WAFER SUBDIVISIONS
                                                                            RSXP 240
C
                                                                            RSXP 241
      DO 2445 I=1.KDIP
                                                                            RSXP 242
                                                                            RSXP 243
      FI=FLOAT(I)
                                                                            RSXP 244
      A=DPST(2,2)+(FI-1.)*DZ
                                                                            RSXP 245
      B=A+02
      A1=AL**(2.0*(8-DPST(2.2))/ZD)
                                                                            RSXP 246
      A2=AL**(2.0*(A-DPST(2,2))/ZD)
                                                                            RSXP 247
      PPST(2, I)=ALL*(ALOG(0.5*(A1+A2)))+DPST(2,2)
                                                                            RSXP 248
      PPST(3, I)=DPST(3,2)*(AL**((PPST(2,I)-DPST(2,2))/ZD))
                                                                            RSXP 249
                                                                            RSXP 250
      PPST(1, I)=DPST(1, MBT)
                                                                            RSXP 251
      PPST(4, I) = SQRT(DPST(4, 1) *DPST(4, 2))
                                                                            RSXP 252
      PPST(5, I)=OPST(5, MBT)/FK
      PPST(6, I)=DZ
                                                                            RSXP 253
      PPST (7.1)=A
                                                                            RSXP 254
                                                                            RSXP 255
      PPST(8, I)=RB*ALL*(A1-A2)
                                                                            RSXP 256
      ADJUST PPST ARRAY VALUES FOR AN IMPACTED PARCEL
                                                                            RSXP 257
С
                                                                            RSXP 258
                                                                            RSXP 259
      IF(PPST(2,1).GT.ZBRSTZ) GO TO 3443
      PPST(1,I) = CX(MCX,1) - (Z8RSTZ - PPST(2,I))/(CNWAF(2) +
                                                                            KSXP 260
     1 (DNHAF(1) - DNHAF(2))*(PPST(2,I) - DPST(2,2))/ZD)
                                                                            RSKP 261
      PFST(2, I) = ZBRSTZ
                                                                            RSXP 262
      PPST(6.1)=0.0
                                                                             RSXP 263
                                                                             RSXP 264
      PPST(7, I)=ZBRSTZ
                                                                             RSXP 265
      PPST(8, I) = 0.0
                                                                            RSXP 266
      G ' TO 2445
                                                                             RSXP 267
 3443 IF(PPST(7.1) .GT. ZBRSTZ) GO TO 2445
      PF3T(6,1)=PPST(6,1) - ZBRSTZ + PPST(7,1)
                                                                             RSXP 268
      PPST(8,I) = PPST(8,I) - 3.1415927*(ZBRSTZ- PPST(7.I))*PPST(3,I)**2 RSXP 269
                                                                             RSXP 270
      PPST(7, I) = ZBRSTZ
                                                                             RSXP 271
 2445 CONTINUE
```

LA DE SONO DE L'ARTE LE CHARLES DE L'ARTE DE L'ARTE

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RSXP 272
 5443 IP=0
                                                                               RSXP 273
 5445 IP=IP+1
                                                                               RSXP 274
C
C
      SET UP THE DPST ARRAY FOR A WAFER SUBDIVISION FROM THE PPST ARRAY RSXP 275
                                                                               RSXP
C
                                                                                    276
                                                                               RSXP 277
      DO 5444 J=1.8
                                                                               RSXP 278
 5444 OPST(J, MBT) =PPST(J, IP)
                                                                               RSXP 279
 5442 GO YO (5448,5447), IFLAG
                                                                               RSXP 280
      SPECIFY FINAL OPST AFRAY FOR A WAFER WITH EQUAL BASE AND TOP RADIIRSXP 281
C
                                                                               RSXP 282
C
                                                                               RSXP 283
 5448 \text{ OPST}(6, MBT) = \text{OPST}(2,1) - \text{OPST}(2,2)
                                                                               RSXP
      DPST(2, M8T)=(DPST(2,1)+DPST(2,2))*0.5
                                                                                    284
      DPST(4, MBT) = SQRT (DPST(4,1) + DPST(4,2))
                                                                               RSYP 285
                                                                               RSXP 286
      DPST(7, MBT) = DPST(2, 2)
      OPST(8, MBT)=DPST(E, MBT) +3.1415927*OPST(3,1) ++2
                                                                               PSXP 287
                                                                               RSXP 288
      IF(IC(6))5447,5447,5826
 5826 WRITE(ISOUT,666) (DPST(I, MBT), I=1,8), MBT, IFLAG
                                                                               RSXP 289
                                                                               RSXP 290
 5447 IF (IRAD) 50 22, 50 22, 78 3
                                                                               RSXP
                                                                                    291
C
                                                                               RSXP
C
                                                                                    292
C
      INITIALIZE FOR HORIZ CHTAL WAFER SUBDIVISION
                                                                               RSXP
                                                                                    293
                                                                               RSXP
C
                                                                                    294
                                                                               RSXP 295
  783 XR=BZ2
                                                                               RSXP 296
      YR=BZ2
                                                                               RSXP 297
 5060 RADIUS=DPST(3.MBT)
                                                                               RSXP 298
      RAD2=RADIUS**2
                                                                               RSXP
 5019 IF(RAD2-2.0*8Z2++2)5022,1094,1004
                                                                                    299
                                                                               RSXP
                                                                                    300
C
                                                                               RSXP
C
                                                                                    311
                                                                               RSXP
C
                                                                                    332
      SPECIFY GDPST ARRAY FOR WAFERS THAT ARE NOT TO BE SUBDIVIDED
                                                                               RSXP
C
                                                                                    313
C
      HORIZONTALLY
                                                                               RSXP
                                                                                    304
C
                                                                               RSXP
                                                                                    305
 5022 LODD=LODD+1
                                                                               RSXP
                                                                                    306
                                                                               RSXP
      GDPST(6,LODO) = DPST(2,MBT)
                                                                                    307
                                                                               RSXP
                                                                                    348
      GDPST(4,LODD) = DPSY(4,MBT)
      GDPST(3,LODD) = DPST( 1,MBT)
                                                                               RSXP
                                                                                    319
      GDPST(5,LODD) = DPST(5,MBT)
                                                                               RSXP
                                                                                    310
                                                                               RSXP 311
      GDPST(1,LODD)=0.
                                                                               RSXP 312
      GOPST(2,LOOQ) = 0.
                                                                               RSXP 313
      GDPST(7,LODD) = DPST(3,MBT)
                                                                               RSXP 314
      GDPST(8,LODD)=DPST(6,MBT)
                                                                               RSXP 315
       GDPST(9,LODD)=DPST(7,MBT)
                                                                               RSXP
       GDPST (10,LODD) = DPST (8,MBT)
                                                                                    316
                                                                               RSXP
       GO TO 5030
                                                                                     317
                                                                               RSXP
 1003 IF((XR)**2+(YR)**2-R$D2)1001,1001,1602
                                                                                     318
                                                                               RSXP
C
                                                                                     319
       SUBDIVIDE WAFERS HORIZONTALLY AND SPECIFY THE GCFST ARRAY DATA
                                                                               RSXP
                                                                                     320
C
                                                                               RSXP
C
                                                                                    321
                                                                               RSXP 322
C
                                                                               RSXP
        COUNT THE TOTAL NUMBER OF HORIZONTAL SUBDIVISIONS
                                                                                    323
C
                                                                               RSXP
                                                                                    324
C
 1004 EX=8Z2
                                                                               RSXP
                                                                                     325
       EY=BZ2
                                                                               RSXP
                                                                                    326
                                                                               RSXP
       CNT =4 . 0
                                                                                    327
                                                                               RSXP
                                                                                    328
 721 C EX=EX+8Z
                                                                               RSXP 329
       IF (EX** 2+EY**2-RAD2) 7201,7201,7202
                                                                               RSXP 330
 7201 CNT=CNT+4.0
                                                                               RSXP 331
       GO TO 7210
```

t var eg tre krendelan kildiger kræmer av dar er kildi dæment ekken med ander er krein etter kræmet krister fæm

```
72u2 EX≈8Z2
                                                                               RSXP 332
      EY=EY+BZ
                                                                               RSXP 333
      IF (EX**2+EY**2-RAD2) 7201,7201,7203
                                                                               RSXP 334
 7203 CMA=DPST(5,MBT) /CNT
                                                                               RSXP 335
 1001 LODD=LODD+1
                                                                               RSXP 336
      LL=L000+3
                                                                               RSXP 337
      DO 1959 J=LODD, LL
                                                                               RSXP 338
      GDPST(9.J) = DPST(7.MET)
                                                                               RSXP 339
      GOPST(10,J)=OPST(8,YBT)/CNT
                                                                               RSXP 340
      GDPST(7,J)=BZ2
                                                                               RSXP 341
      GOPST(8,J)=DPST(6,MET)
                                                                               RSXP
                                                                                     342
      GDPST(6,J)=DPST(2,MET)
                                                                               RSXP
                                                                                     343
      GOPST (4, J) = DPST (4, MBT)
                                                                               RSXP 344
      GDPST (3, J) = DPST (1, MBT)
                                                                               RSXP
                                                                                     345
 1850 GDPST(5,J)=CMA
                                                                               RSXP 346
      GDPST(1,LODD) = XR
                                                                               RSXP 347
      GDPST(2,LODD)=YR
                                                                               RSXP 348
      L000=L000+1
                                                                               RSXP 349
      GDPS T(1, LOOD) = XR
                                                                               RSXP 350
      GDPST(2,LODD) =-YR
                                                                               RSXP 351
      L000=L000+1
                                                                               RSXP 352
      GDPST(1,LODD) = -XR
                                                                               RSXP 353
      GDPST(2,LODD) = -YR
                                                                               RSXP 354
      LODD=LODD+1
                                                                               RSXP 355
      GDPST(1,LODC) =-XR
                                                                               RSXP 356
      GDPST(2,LODD)=YR
                                                                               RSXP 357
 5030 IF(LODD- 97) 1150, 1010, 1010
                                                                               RSXP 358
 1100 IF(IRAD) 2585, 2585, 1101
                                                                               RSXP 359
 1101 XR=XR+8Z
                                                                               RSXP 3 ED
      GO TO 1003
                                                                               RSXP 361
 1002 YR=YR+BZ
                                                                               RSXP 362
      XR = BZ2
                                                                               RSXP 363
      IF (YR-RADIUS) 1063, 1003, 2585
                                                                               RSXP 364
C
                                                                               RSXP 365
C
      LOAD THE GDPST ARRAYS ON THE CRM OUTPUT TAPE
                                                                               RSXP 366
C
                                                                               RSXP 367
 1010 WRITE (TRISE) LODD
                                                                               RSXP 368
      WRITE (IRISE) (GDPST(1,J), GDPST(2,J), GDPST(3,J), GDPST(4,J), GDPST(5,JRSXP
                                                                                     369
     1), GDPST(6, J), GDPST(7, J), GDPST(8, J), GDPST(9, J), GCFST(16, J), J=1, LODDRSXP 370
     2)
                                                                               RSXP 371
      L000=0
                                                                               RSXP 372
      GO TO 1130
                                                                               RSXP 373
 2585 GO TO (258 ,2586), IFLAG
                                                                               RSXP 374
 2586 IF(IP-KDIP)5445,258,258
                                                                               RSXP 375
  258 CONTINUE
                                                                               RSXP 376
  278 CONTINUE
                                                                               RSXP 377
C
                                                                               RSXP 378
C
      LOAD FINAL RESIDUE OF GDPST DATA ON THE CRM CUIFUT TAPE
                                                                               RSXP 379
C
                                                                               RSXP 380
 1630 WRITE (IRISE)LODD
                                                                               RSXP 381
      WRITE (IRISE) (GDPST (1,J), GDPST (2, J), GDPST (3, J), GDPST (4, J), GDPST (5, JRSXP 382
     1), GDPST(6, J), GDPST(7, J), GDPST(8, J), GDPST(9, J), GCPST(10, J), J=1, LOCORSXP 363
     2)
                                                                               RSXP 364
      LODD=0
                                                                               RSXP 385
      WRITE (IRISE) LODD
                                                                               RSXP 386
      END FILE IRISE
                                                                               RSXP 387
      FEWIND IRISE
                                                                               RSXP 358
      RETURN
                                                                               RSXP 369
      END
                                                                               RSXP 390
```

Section Break decision

ADDA TOWN OF STREET, S

```
*DEC k, WNDSFT
                                                                            WNDSF
      SUBROUTINE WNDSFT
                                                                            WNDSF
                                                                            WNUSF
C
      H. G. NORMENT. A(MOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                            WNDSF
                                                                            WNDSF
                                                                          **WNDSF
С
                                                                            WNDSF
      THIS PROGRAM READS A TAPE ( IRISE) OF DATA WHICH DESCRIBES AN
                                                                            WNOSF
      AXIALLY SYMMETRIC STABILIZED CLOUD OF FALLCUT PARCELS
                                                                            WNDSF
      AND TRANSLATES THE HIRIZINTAL COCRDINATES OF EACH PARCEL
                                                                            WNDSF
                                                                                  16
      TO ACCOUNT FOR WIND ERIFT DURING THE CLUUD RISE TIME INTERVAL.
                                                                            WNDSF
                                                                                  11
      IT ALSO APPLIES A TRANSLATION OF GZ COORDINATES AND TIME.
                                                                            WNDSF
                                                                                  12
C
      RESULT IS WRITTEN ONTO TAPE JPARN FOR USE BY THE TRANSPORT MODULE. WNOSF
                                                                            WNDSF
C
                             GLOSSARY
                                                                           *WNDSF
C
                                                                            WNDSF
C
      DWAF(I)
                 PARCEL VERTICAL DIMENSION (M)
                                                                            WNDSF
                                                                                  17
C
      DX
                  WIND-SHIFT CORRECTION TO BE ADDED TO THE PARCEL X
                                                                            WNOSF
                                                                                  18
                                                                            WNOSF 19
                  COORDINATE
C
      DY
                  WIND-SHIFT CORRECTION TO BE ACCED TO THE PARCEL Y
                                                                            WNDSF 20
C
                  COCRDINATE
                                                                            WNDSF
C
      FV
                  STILL AIR PARTICLE SETTLING RATE
                                                                            WNDSF 22
C
      IRROR
                  NUMBER OF STATEMENT NEAR WHERE AN ERROR WAS DISCOVERED WNDSF
                  TOTAL PARTICULATE MASS (KGM) OF PARCEL
      PMAS(I)
                                                                            WNDSF 24
      RV
                  UPWARD CCPPONENT OF VELOCITY OF A STEM PARCEL
                                                                            WNDSF 25
      RWAF(I)
                  RAJIUS (METERS) OF PARCEL AT CENTER OF MASS
                                                                            WNDSF
                                                                                  - 26
      TC(I)
                  TIME (RELATIVE TO CETONATION OF) THE I-TH CLOUD RISE
                                                                            WNDSF
                                                                                  27
                                                                            WNDSF
                  TABLE ENTRY
                                                                                  28
      TCUR
                  PARCEL
                           TIME COORDINATE DURING A WIND DRIFT
                                                                            WNDSF
                                                                                  29
C
                  ADJUSTMENT CALCULATION INCREMENT
                                                                            WNDSF
                                                                                  30
      TP(I)
                  TIME OF DEFINITION (SEC) OF THE I TH PARCEL
                                                                            WNDSF
                                                                                   31
      VB(I)
                              VEL. OF THE I-TH CLOUD RISE TABLE ENTRY
                  CLOUD BASE
                                                                            WNDSF
      VC(I)
                  VELOCITY ASSOCIATED WITH CLOUD AT ZC(1) AT TC(1).
                                                                            WNDSF
                  CLOUD TOP VELOCITY OF THE I-TH CLOUD RISE TABLE ENTRY
      VI(I)
                                                                            WNDSF 34
      VWAF(I)
                  PARCEL VOLUME (M**3)
                                                                            WNDSF
C
                  X COORDINATE OF THE CLOUD CAP CENTER FOR THE 1TH CLOUD HNDSF 36
      XC(I)
C
                  RISE TABLE ENTRY AFTER WIND SHIFT ACJUSTMENT
                                                                            WNDSF 37
      XPAR(I)
C
                  ADJUSTED X COORDINATE OF PARCEL (M)
                                                                            WNDSF
C
      YC(I)
                  Y COORDINATE OF THE CLOUD CAP CENTER FOR THE ITH CLOUD WNDSF
                                                                                  79
                  RISE TABLE ENTRY AFTER WIND SHIFT ADJUSTMENT
C
                                                                            WNDSF
                                                                                  40
      YPAR(I)
                  ADJUSTED Y COORDINATE OF PARCEL (M)
                                                                            WNDSF
                                                                                  41
С
      ZB(I)
                  CLOUD BASE ALT.
                                     OF THE I-TH CLOUD RISE TABLE ENTRY
                                                                            WNOSF
                                                                                  42
C
                  (METERS ABOVE MSL)
                                                                            WNOSF
                                                                                  +3
C
      ZC(I)
                                      OF THE I-TH CLOUD RISE TABLE ENTRY
                  CLOUD CENTER ALT.
                                                                            WNDSF
C
                  (METERS ABOVE MSL)
                                                                            WNDSF
                                                                                  45
C
      ZCUR
                  PARCEL
                           ALTITUDE AT THE BEGINNING OF A WIND DRIFT
                                                                            WNDSF
                                                                                  46
C
                  ADJUSTMENT CALCULATION INGREMENT
                                                                            WNDSF
                                                                                   47
                  ALTITUDE OF PARCEL BASE (M)
С
      ZLOW(I)
                                                                            WNDSF
C
      ZPAR(I)
                  Z COORDINATE OF PARCEL (M ABOVE MSL)
                                                                            WNDSF
                  CLOUD TOF ALTITUDE OF THE I-TH CLOUD RISE TABLE ENTRY
C
      ZT(I)
                                                                            WNOSE
                                                                                  50
C
                  (METERS ABOVE MSL)
                                                                            HNDSF
                                                                                  51
                                                                            WNDSF
                                                                            WNOSF
       COMMON /ATMOS/ NAT, ALT(256), ATP(256), PRS(256), RLH(256),
                                                                            WNDSF
              RHO(256), ETA(256), ...HUDO, ZV(10J), VX(10J), VY(10J)
                                                                            WNUSF
                                                                                  56
      COMMON /BASIC/ W,FW,ZBRSTZ,HEIGHT,ZSCL,SLOTMF,TMSD,XGZ,YGZ,TGZ
                                                                            WNDSF
                                                                                  57
      COMMON /CONTRL/ DETID(12), IC(20), IRAD, IRISE, IS IN, I SOUT, JP ARN, KUI
                                                                            WNDSF
                                                                                  58
      COMMON /INITL/ F, PHI, SSAM, THE, THPG, TMPS, VFR
                                                                            WNDSF
                                                                                  F 9
      COMMON /PARTGL/ NOTR, RHCP, DMEAN, SO, PS (JUJ), TO 12(1), FMASS (JUL)
                                                                            WNOSF 60
```

```
COMMON /TABLES/ MCX, CX(50,10), GOPST(10,100)
                                                                           WNDSF 61
                                                                            WNDSF 62
C
                        TC(50), XC(50), YC(50), ZC(50), VC(50),
                                                                    ZT(50), WNDSF 63
      STMENSTON
                          VT(50), XPAR(130), YPAR(130), TP(100),
        ZB(50),
                                                                            WNDSF
                                                                                  64
        PSIZ(180), PMAS(180), ZPAR(180), RWAF(184), CWAF(184),
                                                                            WNDSF
       ZLOW(100), VWAF(180)
                                                                            WNDSF 66
                                                                            WNDSF 67
      EQUIVALENCE (TG(1),CX(1,1)),(ZT(1),CX(1,4)),(ZB(1),CX(1,3)),
                                                                            WNDSF 68
        (VB(1),CX(1,6)),(VT(1),CX(1,7)), (XPAR(1),GDPST(1)), (YPAR(1),
                                                                           WNDSF 69
        GDPST(101)), (TP(1),GDPST(201)), (PSIZ(1),GDPST(301)),
                                                                            WNDSF
                                                                                  70
         (PMAS(1),GDPST(401)), (ZPAR(1),GDPST(501)), (RWAF(1),GDPST(601) WNDSF
                                                                                  71
     4), (DWAF(1),GDPST(701)), (ZLOW(1),GDPST(801)),(VWAF(1),GDPST(961))WNDSF
     5,(XC(1),CX(1,2)),(YC(1),CX(1,8)),(ZC(1),CX(1,9)),(VC(1),CX(1,10)) WNDSF
      DATA PROGRM/6HWNDSFT/
                                                                            WNDSF
                                                                                  75
                                                                            WNDSF
    1 FORMAT(1X,A6,I3,4E12.5,I5)
                                                                                  76
 5022 FORMAT(1H124X,16HCLCLD TRAJECTORY/6X,2HXC,12X,2HYC,12X,2HZC,12X,2HWNDSF
     1TC, 12X, 2HVC)
    2 FORMAT(5(1X,E13.6))
                                                                            WNDSF 79
    4 FORMAT(1X, I5)
                                                                            WNDSF
                                                                            WNDSF 81
 3013 FORMAT( ///
              10X,14HBLOCK COUNT = I5//)
                                                                            WNDSF
 1012 FORMAT(1X,*PARTICLE BLOCK BEFORE SHIFT*,/8X,*X*,11X,*Y*,11X,*T*,9XHNDSF 83
     1,*PSIZ*,9X,*PMAS*,10x;*Z*,9X,*RWAF+,8X,*DWAF*, &X,*ZLOW*,8X,*VWAF*,WNDSF
                                                                                  85
    3 FORMAT(1X, *PARTICLE BLOCK AFTER SHIFT *, /8X, *X*, 11X, *Y*, 11X, *T*, 9X WNDSF
                                                                                  ₫6
     1, #PSIZ#, 9X, #PMAS#, 10X, #Z#, 9X, #RWAF+, 8X, *DWAF+, 8X, *ZLOW+, 8X, *VWAF+, WNDSF
                                                                                  E 7
     2//(1X,10E12.5))
                                                                            WNDSF
                                                                                  88
C
                                                                            WNOSE
                                                                          ** WNDSF
                                                                                  90
                                                                            WNDSF
                                                                                  31
                                                                            WNDSF
      IF(NHODO)100,100,200
                                                                                  92
                                                                          WNDSF 93
  100 IRROR=-100
      CALL ERROR (PROGRM, IRRCR, ISOUT)
                                                                            WNDSF 94
                                                                            WNDSF 95
      INITIALIZE TAPES
                                                                            WNDSF
  200 REWIND IRISE
      PEWIND JPARN
      WRITE(JPARN)FW,SSAM,SLOTMP,TMSD,SD,W,HEIGHT,RHOP,CX(MCX,5),ZBRSTZ WNDSF 99
                                                                            WNDSF1J0
      WRITE(JPARN)XGZ-YGZ-YGZ
      WRITE (JPARN) (DETID(I), I=1,12)
                                                                            WNDSF191
      WRITE (JPARN) NDSTR
                                                                            WNUSF132
      WRITE (JPARN) (PS(J), DIAM(J), FMASS(J), J=1, NDSTR)
                                                                            WNDSF133
      WRITE (JPARN) NAT
                                                                            WNDSF144
      WRITE(JPARN)(ALT(J),ATP(J),PRS(J),RLH(J),RHO(J),ETA(J),J=1,NAT)
                                                                            WNDSF 105
                                                                            WNDSF136
      COMPUTE CLOUD CENTER AND STEM DRIFT FACTOR ENTRIES IN RISE TABLE WNDSF117
C
                                                                            WNDSF138
   10 CONTINUE
                                                                            WNDSF1J9
      DO 25 I=1, MCX
                                                                            WNDSF110
      ZC(I) = (ZB(I) + ZT(I))/2.9
                                                                            WNDSF111
      VC(I) = (VB(I) + VT(I)) / 2.0
                                                                            WNDSF112
                                                                            WNDSF113
      CONTINUE
      MCXP1 = MCX + 1
                                                                            WNDSF114
      MHODO=NHODO-1
                                                                            WNDSF115
                                                                            WNDSF116
      ENSURE THAT WIND VECTORS ARE DEFINED TO ABOVE
                                                                            WNDSF117
C
C
      STABLIZED CLOUD BOTTCM ALTITUDE
                                                                            WNOSF118
C
                                                                            WNOSF119
      IF ((ZV(NHODO)+ZV(MHCDO))/2.0 .GE. ZB( MCX )) GC TO 2217
                                                                            WNOSF120
```

```
26 IRROR=-26
                                                                             WNDSF121
      GO TO 7734
                                                                             WNDSF122
C
                                                                             WNDSF123
      FIND HODOGRAPH VECTOR ALTITUDE APPROPRIATE FOR INITIAL TIME
                                                                             WNDSF124
 2217 J=1
                                                                             WNDSF125
      K=1
                                                                             WNDSF126
 28
      IF(ZC(1)-(ZV (J+1)+ZV(J))/2.0)
                                        35,35,31
                                                                             WNOSF127
 30
      IF(J-NHODO) 31,32,32
                                                                             WNDSF128
 31
      J=J+1
                                                                             HNDSF129
      GO TO 28
                                                                             WNDSF 130
 32
      IRROR = -32
                                                                             WNDSF131
      GO TO 7734
                                                                             WNDSF132
C
                                                                             WNDSF133
C
      COMPUTE HORIZONTAL CISPLACEMENTS VS. TIME FOR THE CLOUD BOTTOM
                                                                             WNDSF134
C
      CENTER.
                                                                             WNDSF135
 35
      XT = TC(1) * VX(J)
                                                                             WNDSF136
      YT=TC(1)*VY(J)
                                                                             WNOSF137
      XC(1) = XT
                                                                             WNDSF138
      YC(1)=YT
                                                                             WNDSF139
      TTEMP=TC(1)
                                                                             WNDSF140
      ZTEMP=ZC(1)
                                                                             WNDSF141
                                                                             WNDSF142
 122 WHICH IS LOWER, NEXT CLOUD POSIT OR NEXT HODOGRAPH VECTOR
                                                                             HNDSF143
                                                                             HNDSF144
  122 IF(J.GE.NHODO) GO TO 124
                                                                             WNDSF145
      IF((ZV(J+1) + ZV(J))/2. -ZC(K+1))123,124,124
                                                                             WNDSF146
  123 DELT=((ZV(J+1)+ ZV(J))/2.- ZTEMP)/VC(K)
                                                                             WNDSF147
      ZTEMP= (ZV(J+1)+ZV(J))/2.
                                                                             WNDSF148
      TTEMP=TTEMP+DELT
                                                                             WNDSF149
      XT = XT +
                   VX(J) * DELT
                                                                             WNDSF150
      +TY=TY
                   TJ30*(L)YV
                                                                             WNDSF151
      J=J+1
                                                                             WNDSF152
      GO TO 122
                                                                             WNDSF153
C
                                                                             WNDSF154
      NEXT CLOUD CELL CENTER IS LOWER
                                                                             WNDSF155
  124 DELT=TC(K+1)-TTEMP
                                                                             WNDSF156
      TTEMP=TC(K+1)
                                                                             WNDSF157
      ZTEMP=ZC(K+1)
                                                                             WNDSF158
      XC(K+1) = XT + VX(J) *DELT
                                                                             WNDSF159
      YC(K+1)=YT+VY(J)*DELT
                                                                             WNDSF160
      XT = XC(K+1)
                                                                             WNDSF161
      YT=YC(K+1)
                                                                             WNDSF162
      K=K+1
                                                                             WNOSF163
      IF(K- MCX ) 122,125,125
                                                                             WNDSF164
                                                                             WNDSF165
C 125 CLOUD TRAJECTORY IS COMPLETE
                                                                             WNDSF166
  125 WRITE(ISOUT,6022)
                                                                             WNDSF167
      WRITE (ISOUT, 2) (XC(J), YC(J), ZC(J), TC(J), VC(J), J=1, MCX)
                                                                             WNDSF158
                                                                             WNDSF169
  104 READ(IRISE) N
                                                                             HNDSF170
      IF(N)102,102,103
C 102 FINAL EXIT.
                     ALL DATA HAVE BEEN MODIFIED. MARK JPARIN COMPLETED. WNDSF173
 102
      N = 0
                                                                             WNDSF174
      IF (IC(7)) 2013, 2014, 2013
                                                                             WNDSF175
 2013 WRITE(ISOUT, 3013) N
                                                                             WNDSF176
 2014 WRITE(JPARN )N
                                                                             WNDSF177
      END FILE JPARN
                                                                             WNDSF178
      REWIND JPARN
                                                                             WNDSF179
      REWIND IRISE
                                                                             WNDSF180
```

```
WNDSF181
 7734 CALL ERROR (PROGRM, IRROR, ISOUT)
                                                                             WNDSF132
      PETURN
                                                                             WNDSF183
                                                                             WNDSF184
 103 READ A BLOCK OF N PARTICLE DESCRIPTIONS
                                                                             WNDSF185
  103 READ(IRISE )(XPAR(J), YPAR(J), TP(J), PSIZ(J), PMAS(J), ZPAR(J), RWAF(J) WNDSF136
     1,DWAF(J).ZLOW(J),VWAF(J),J=1,N)
                                                                             WNDSF147
      IF(IC(/))2015,2010,2015
                                                                             WNDSF188
 2015 WRITE (ISOUT, 3013) N
                                                                             WNDSF189
      WRITE (ISOUT, 1012) (XPAR(I), YPAR(I), TP (I), PSIZ(I), PMAS(I), ZPAR(I),
                                                                             WNDSF190
     1RWAF(I), DWAF(I), ZLCW(I), VWAF(I), I=1, N)
C
                                                                             WNDSF132
      NUW PREPARE TO SHIFT FARTICLES HORIZONTALLY IN ACCORDANCE WITH THEWNDSF193
C
      POSITION OF THE CLOUD AT THE TIME WHEN THE PARTICLE LEFT THE SLOUDWNDSF194
С
                                                                             WNDSF495
         FIRST INITIALIZE FOR ENTERING A LOOP ON PARTICLES
                                                                             WNDSF196
 2010 OLDZ=-99999.0
                                                                             WNDSF197
      OLDPS=-1.0
                                                                             WNDSF198
      OL 77=-1.3
                                                                             WNDSF199
      1 ≔ ل
                                                                             WNDSF200
C 105 WAS THE CURRENT (J-TH) PARTICLE DEFINED AT THE SAME TIME AS THE
                                                                             WNOSF2J1
      PREVIOUS ONE.
                       YES TO 1051
                                                                             HNDSF222
  135 IF (TP(J)-OLDT) 186,1851,186
                                                                             HNDSF 293
                                                                             WNDSF204
C1051 IS THE CURRENT (J-TH) PAFTICLE THE SAME SIZE AS THE PREVIOUS ONE. WNDSF265
C
      YES TO 137
                                                                             WNDSF206
 1051 IF(PSIZ(J)-OLDPS)108,107,106
                                                                             WNDSF 207
                                                                             HNDSF208
 107 TS THE J-TH PARTICLE AT THE SAME ALTITUDE AS THE PREVIOUS ONE.
                                                                             HNDSF219
      YES TO 108
C
                                                                             WNDSF 210
      TF (ZPAR (J) -OLDZ) 106,108,106
 107
                                                                             WNDSF211
                                                                             WNDSF212
C
 108 THE PARTICLE WILL HAVE THE SAME HORIZONTAL DISPLACEMENTS AS THE
                                                                             WNDSF213
      PREVIOUS ONE AND WILL LEAVE THE CLOUD AT THE SAME TIME AND ALTI-
                                                                             WNDSF214
      TUDE AS THE PREVIOUS ONE. ADDITION OF XGZ.YGZ MAKES XPAR, YPAR
                                                                             WNDSF215
      PELATIVE TO CUORCINATE SYSTEM ORIGIN
                                                                             WNOSF 216
  133 TP(2)=TP(J)+TGZ
                                                                             WNUSF 217
      XPAR(J)=XPAR(J)+DX+XGZ
                                                                             HNDSF218
      YPAR(J) = YPAR(J) + DY + YGZ
                                                                             WNUSF219
                                                                             WNDSF220
      INCREMENT AND TEST J TO CONSIDER THE NEXT PARTICLE OR RETURN TO
                                                                             WNDSF221
      FETCH THE NEXT BLOCK OF FARTISLE DATA.
C
                                                                             WNDSF222
      J=J+1
                                                                             WNDSF223
      IF (J-H) 105, 105, 110
                                                                             WNDSF224
                                                                             WNDSF 225
C
 110 PUT THE MODIFIED DATA ON THE TAPE JPAPIN AND THEN RETURN TU
                                                                             WNDSF226
      FETCH THE NEXT DATA BLOCK.
                                                                             WNDSF227
  113 WRITE (JPARN IN
                                                                             WNDSF228
      WRITE (JPARN ) (XPAR(J), YFAR(J), ZFAR(J), TF(J), PSIZ(J), PMAS(J), RWAF WNDSF229
     1(J), DWAF(J), 7LOW(J), VWAF(J), J=1, N;
                                                                             WNDSF230
      IF(IC(7))185,104,185
                                                                             WNOSF231
  185 WRITE (ISCUT, 4) N
                                                                             WNDSF232
                                                                             WNDSF233
      WRITE(ISOUT,3)(XPAR(I),YPAR(I),TF(I),PSIZ(I),PMAS(I),ZPAR(I),
     1RWAF(I), DWAF(I), ZLCW(I), VWAF(I), I=1, N)
                                                                             WNDSF234
  190 GO TO 104
                                                                             WNDSF235
                                                                             WNUSF236
      OLOPS=PSIZ(J)
      OLD Z= ZP AR(J)
                                                                             WNDSF 237
      OLDI=TP(J)
                                                                             HNDSF 238
                                                                             WNDSF239
      DIO J-TH PARTICLE LEAVE THE CLUUD.
                                              NU TO 115
                                                                             WNDSF240
```

and the first of the second second

RETURN

```
IF(ZPAR(J)-ZB( MCX )) 114,115,115
                                                                            WNDSF241
C
                                                                            WNDSF242
                                                                            HNDSF243
C
 1.15 TAKE CARE OF PARTICLES THAT DON'T LEAVE THE CLOUD
 115
      DX=XC(MCX)
                                                                            WNDSF 244
      DY=YC (MCX)
                                                                            WNDSF245
C
      TP(J) AND ZPAR(J) ARE OK AS IS.
                                                                            WNDSF246
      GO TO 108
                                                                            WNDSF247
C
                                                                            WNDSF248
C
 114 THE PARTICLE HAS LEFT THE CLOUD
                                                                            WNDSF249
                                                                            WNDSF250
  114 ZCUR=ZPAR(J)
                                                                            WNDSF251
      IF( ZCUR .LT. ZBRSTZ ) ZCUR=ZBRSTZ
                                                                            WNDSF252
      TCUR=TP(J)
                                                                            WNDSF253
      DX=0.
                                                                            WNDSF254
      DY=0.
                                                                            WNUSF255
      COMPUTE ATMOSPHERE PROPERTIES AT ZOUR
C
                                                                            WNDSF256
      CALL TRPL(ZCUR, NAT, ALT, ATP, T)
                                                                            WNDSF257
      CALL TRPL(ZCUR, NAT, ALT, PRS, P)
                                                                            WNDSF258
      CALL TRPL(ZCUR, NAT, ALT, RHO, DEN)
                                                                             WNDSF259
      CALL TRPL(ZCUR, NAT, ALT, ETA, VIS)
                                                                            WNDSF260
C
                                                                            WNDSF261
C
      LOCATE PARTICLE DEFINITION TIME IN THE CLOUD RISE TABLE.
                                                                            WNDSF262
                                                                            WNDSF263
C
      00 210 K=1.MCX
                                                                            WNDSF264
      LL=MCXP1-K
                                                                            WNDSF265
      IF(TC(LL).LE.TP(J)) GO TO 221
                                                                            WNOSF266
  210 CONTINUE
                                                                            WNDSF2 E7
  211 IRROR=-211
                                                                            WNDSF268
      GO TO 7734
                                                                            WNDSF269
                                                                             WNDSF270
C 221 LOCATE INITIAL PARTICLE ALTITUDE IN THE WIND HODOGRAPH TABLE
                                                                            WNDSF271
                                                                            WNDSF272
  221 DO 230 K=1. MHODO
                                                                             WNDSF273
      IF((ZV(K)+ZV(K+1))/2.0.GT.ZPAR(J))GO TO 248
                                                                            WNDSF274
  230 CONTINUE
                                                                             WNOSF275
      MM=NHODO
                                                                             WNDSF276
      GO TO 220
                                                                             WNDSF277
  240 MM=K
                                                                             WNDSF278
                                                                             WNDSF279
  220 FIND CLOUD BOTTOM ALTITUDE AT THE PARTICLE DEFINITION TIME
                                                                             WNDSF280
С
  220 ZBOTOM= ZE(LL) +(TP(J)-TC(LL))*VB(LL)
                                                                             WNDSF281
      IF((ZBOTOM- ZCUR).LE.115.*W**(0.151)) GO TO 225
                                                                             WNDSF282
C
                                                                             WHUSF253
C
      LOCATE INITIAL PARTICLE ALTITUDE IN THE CLOUD RISE HISTORY TABLE
                                                                            WNDSF284
C
                                                                            WNDSF285
      DO 222 K=1.MCX
                                                                             WNDSF286
      NN=MCXP1-K
                                                                             WNDSF237
      IF(ZB(NN).LE.ZCUR) GC TO 224
                                                                             HNDSF288
  222 CONTINUE
                                                                             WNDSF289
C
                                                                             WNDSF290
      COMPUTE AN AVERAGE BASE RATE, BV
Ç
                                                                             WNDSF291
                                                                             HNDSF292
  224 IF(LL,GT.NN)GO TO 3224
                                                                             WNDSF293
       BV=VB(LL)
                                                                             WNDSF294
      GO TO 3227
                                                                            WNDSF295
 3224 8V=0.
                                                                             WNDSF296
      DO 3225 K=NN.LL
                                                                             WNDSF297
      IF(K.EQ. MCX ) GO TO 3226
                                                                             WNDSF236
 3225 BV=BV +VB(K)*(TC(K+1)- TC(K))
                                                                             WNDSF239
 3226 BV= 9V/(TC(LL)-TC(NN))
                                                                             WNDSF3J0
```

```
3227 CALL SETTLE (PSIZ(J), RHOP, DEN, VIS, T, P, FV, IACCR)
                                                                           WNDSF331
      CAN THE PARTICLE BE MOVEC SIGNIFICANTLY IN THE TIME AVAILABLE---- WNDSF303
C
              YES TO 250
                                                                           WNDSF304
C
              NO TO 315
                                                                           WNDSF305
                                                                           WNDSF316
      IF(( ZBOTOM-ZCUR+10.().LT.(TP(J)-TC(1))*(FV+BV)) GO TO 250
                                                                           WNDSF317
  225 DELTEE=0.
                                                                           WNDSF318
      GO TO 315
                                                                           WNDSF309
                                                                           WNDSF310
     INDEX MM IDENTIFIES THE WIND HODGGRAPH STRATUM IN WHICH THE
C
                                                                           WNDSF311
C
      PARTICLE IS CURRENTLY DEFINED.
                                                                           WNDSF312
                                                                           WNDSF313
                 IDENTFIES THE CLOUD RISE HISTORY TABLE ENTRY WHICH
                                                                           HNDSF314
      REPRESENTS THE RISE INCREMENT DURNING WHICH THE PARTICLE IS
                                                                           WNDSF315
      CURRENTLY DEFINED.
                                                                           WNDSF316
                                                                           WNDSF317
C 245 LOCATE CURRENT PARTICLE ALTITUDE IN THE WIND HODOGRAPH TABLE
                                                                           WNDSF318
                                                                           WNDSF319
  245 DO 246 K=1.MHODO
                                                                           WNDSF320
      IF((ZV(K) +ZV(K+1))/2.0 .GT. (ZCUR+ 1.0))GO TO 247
                                                                           WNDSF321
                                                                           WNDSF322
  246 CONTINUE
      MM=NHODO
                                                                           WNDSF323
      GO TO 250
                                                                           HNDSF324
  247 MM=K
                                                                           KNDSF325
                                                                           WNDSF326
  250 CONTINUE
                                                                           WNDSF327
                                                                           WNDSF328
C
      DETERMINE IF NET PARTICLE MOTION IS UPWARD OR DOWNWARD.
                                                                           WNDSF329
                                                                           WNUSF330
C
                     UPWARD TO 251
      CALL SETTLE (PSIZ(J), RHOP, DEN, VIS, T, P, FV, IACCR)
                                                                           WNDSF331
                                                                           WNDSF332
                    DOWNWARD TO 253
                                                                           WNDSF333
                                                                           WNDSF334
      IF((ZBOTOM-ZBRSTZ) .GT.O.O) GO TO 2298
                                                                           HNDSF335
 2297 RV=0.
                                                                           WNDSF336
      GO TO 2299
                                                                           WNDSF337
 2298 RV=VB(LL)*( 1.0+( ZCUR-ZBOTOM)/( ZBOTOM-ZBRSTZ))
                                                                           WNDSF338
      IF ( ABS (RV) .GT. ABS (VB (LL)) ) RV=VB (LL)
                                                                           WNDSF339
 2299 IF(FV-RV .GE.G.0)GO TO 253
                                                                           WNDSF340
                                                                           WNDSF341
C 251 COMPUTE THE TIMES REGUIRED FOR THE PARTICLE TO MOVE TO THE
                                                                           WNDSF342
C
      BOITOM OF THE HODOGRAPH STRATUM IN WHICH IT RESIDES, AND TO THE
                                                                           WNDSF343
C
      BASE OF THE CLOUC. USE THE SMALLER OF THESE TIMES.
                                                                           WNDSF344
C
                                                                           WNDSF345
  251 IF((MM-1).GT.0) GO TO 252
                                                                           WNDSF346
                                                                            WNDSF347
      DELZEE= ZBRSTZ-ZCUR
      GO TO 1253
                                                                           WNDSF348
  252 DELZEE= (ZV(MM) +ZV(MM-1))/ 2.6-ZGUR
                                                                            WNDSF349
      IF (DELZEE .LT. -0. C1)60 TO 1253
                                                                            WNDSF350
      MM=MM-1
                                                                            WNDSF351
      GO TO 251
                                                                            WNDSF352
 1253 DELTEP= DELZEE/(FV-RV)
                                                                            WNDSF353
  254 DELTEE= (ZBOTOM-ZCUR)/(FV-RV+VB(LL))
                                                                            WNDSF354
      IF( DELTEE.LT. DELTEF) GO TO 255
                                                                            WNDSF355
      DELTEE= DELTEP
                                                                            WNDSF356
  255 IF(DELTEE.GE.O.Q) GC TO 278
                                                                            WNDSF357
  256 IRROR=-256
                                                                            HNUSF 358
                                                                            WNDSF359
      GO TO 7734
                                                                            WNUSF360
```

```
C 253 COMPUTE THE TIMES REQUIRED FOR THE PARTICLE TO MOVE TO THE TOP OF WNDSF361
C
      THE HODOGRAPH STRATUM IN WHICH IT RESIDES, AND TO THE BASE OF THE WNDSF362
C
      CLOUD. USE THE SMALLER OF THESE TIMES.
                                                                           WNDSF363
C
                                                                           WNDSF364
  253 DELTEP= ((ZV(MM)+ ZV(MM+1))/2.0 -ZCUR)/(FV-RV)
                                                                           WNDSF365
      GO TO 254
                                                                           WNDSF366
C
                                                                           WNDSF367
  278 TMIUDT=TGUR-DELTEE
                                                                           WNDSF368
                                                                           WNDSF369
      IF(IC(8).EQ.8)GO TO 279
      IAC=278
                                                                           WNDSF370
                                                                           HNDSF371
      WRITE(ISOUT, 2310) IAC,
                        J,LL,MM,LLL,DELTEE, ZBOTOM,RV, FV,TCUR, ZCUR, TMIUDT HNDSF372
     1
 2310 FORMAT(15/
                                                                           WNDSF373
                415/7(3X.E12.5))
C
                                                                           WNDSF375
C
      FIND THE POSITION OF TIME THIUDT IN THE CLOUD RISE TABLE.
                                                                           WNDSF376
                                                                           WNDSF377
  279 LLL=LL
                                                                           WNDSF378
  280 IF(TC(LL).LE.THIUDT) GO TO 290
                                                                           WNDSF379
      LL=LL-1
                                                                           WNDSF380
      IF(LL.GE.1) GO TO 280
                                                                           WNDSF381
                                                                           HNDSF382
      THIUDT= TC(1)
                                                                           WNDSF383
      LL=1
      DEL TEE = TCUR -TC(1)
                                                                           WNDSF384
C
                                                                           WNDSF385
C
      COMPUTE THE CLOUD BOTTOM HEIGHT, ZBOTOM, AT THE TIME TMIUDT.
                                                                           WNDSF386
C
                                                                           WNDSF387
  WNDSF368
                                                                           WNDSF389
      IS THIS CLOUD BOTTOM ALTITUDE LESS THAN OR EQUAL TO THE PARTICLE
C
                                                                          WNDSF390
C
      ALTITUDE-
                                                                           WNDSF391
С
         YES TO 295 OR 320
                                                                           WNDSF392
C
                                                                           WNDSF393
         NO TO 300
C
                                                                           HNDSF394
  291 TMPDZ=ZBOTOM-ZCUR-(FV-RV) *DELTEE
                                                                           WNDSF395
      IF(ABS(TMPDZ).LE.5.0) GO TO 320
                                                                           WNDSF396
                                                                           WNDSF397
      IF(TMPDZ)295.320.300
                                                                           WNDSF398
 295 CLOUD BASE AND PARTICLE TRAJECTORIES HAVE CROSSED. IF POSSIBLE,
                                                                           HNDSF 399
C
      GO BACK TO THE STEP JUST BEFORE THE CROSSING OCCURS.
C
                                                                           WNDSF410
                                                                           WNDSF431
  295 LL=LL+1
                                                                           WNDSF4J2
      IF(LLL-LL) 296, 310, 297
                                                                           WNDSF403
                                                                           WNDSF464
  296 LL=LLL
                                                                           WNDSF405
      GO TO 313
  297 DELTEE= TOUR-TO(LL)
                                                                           WNDSF 436
      ZBOTOM= ZB(LL)
                                                                           WNDSF407
      TMPDZ=ZBOTOM-ZCUR-(FV-RV)*DELTEE
                                                                           WNDSF408
                                                                           HNDSF 419
      IF (ABS(TMPDZ).LE.5.0) GO TO 311
      IF (TMPOZ) 295, 311, 300
                                                                           HNDSF410
                                                                           WNDSF411
  300 INCREMENT PARTICLE SHIFT PARAMETERS
                                                                           WNDSF412
  300 DX=DX+VX( MM) *DELTER
                                                                           WNDSF413
                                                                           WNDSF414
      DY=DY+VY( MM) *DELTEE
      TCUR=TCUR-DELTEE
                                                                           WNDSF415
      ZCUR=ZCUR+ (FV-RV) *DELTEE
                                                                           HNDSF416
      COMPUTE ATMOSPHERE PROFERTIES AT ZOUR
                                                                           WNDSF417
C
      CALL TRPL(ZCUR, NAT, ALT, ATP, T)
                                                                           WNDSF418
      CALL TRPL(ZCUR, NAT, ALT, PRS, P)
                                                                           WNDSF419
                                                                           WND55 420
      CALL TRPL(ZCUR, NAT, ALT, RHO, DEN)
```

```
CALL TRPL(ZCUR, NAT, ALT, ETA, VIS)
                                                                            HNDSF421
      IF(IC(8).EQ.G)GO TO 245
                                                                            WNDSF422
                                                                            WNDSF423
      IAC=300
                                                                            WNDSF424
      WRITE (ISOUT, 2310) IAC.
                        J.LL, MM, LLL, DELTEE: ZBOTOM, RV, FV, TCUR, ZCUR, TMIUDT WNDSF425
     1
      GO TO 245
                                                                            WNDSF426
C
                                                                            WNDSF427
                                                                            WNDSF428
 310 MAKE FINAL ADJUSTMENTS TO PARTICE SHIFT PARAMETERS.
                                                                            WNDSF429
                                                                            HNDSF430
                                                                            WNDSF431
  310 Z80T0M=Z8( LL)+V8( LL)+(TCUR-TC( LL))
                                                                            WNDSF432
      DEL TEE= (ZBOTOM-ZCUR)/(VB( LL)-RV+FV)
                                                                            WNOSF433
  311 IF(DELTEE.LT. 0.0) DELTEE=0.
                                                                            WNDSF434
                                                                            WNDSF435
      IF ((TCUR-DELTEE) .LT. 0.0) DELTEE=J.0
  315 IF (TG(LL) .LE. (TGUR-CELTEE-0.1)) GO TO 320
                                                                            WNDSF437
      LL=LL-1
      IF(LL.GE.1) GO TO 315
                                                                            WNDSF438
                                                                            WNDSF439
      LL=1
  329 DELTRP = (TOUR -DELTEE-TO( LL))/(TO( LL+1) -TO( LL))
                                                                            WNDSF440
  322 DX=DX+VX( MM)*DELTEE + XC( LL) + (XC( LL*1) -XC( LL))*DELTRF
                                                                            WNDSF441
      DY=DY+VY( MM)*DELTEE + YC( LL)
                                        + (YC( LL+1) -YC( LL))*DELTRF
                                                                            WNDSF442
      IF(IC(8).EQ.0)GO TO 108
                                                                            WNDSF443
                                                                            WNDSF444
      IAC=320
      WRITE(ISOUT, 2310) IAC,
                                                                            WNDSF445
                        J,LL,MM,LLL,DELTEE,ZBOTCM,RV,FV,TCUR,ZCUR,TM1UBT WNDSF446
      GO TO 108
                                                                            WNDSF447
                                                                            WNDSF448
C
                                                                            WNDSF449
      END
```

```
ADVEC
*DECK, ADVEC
      SUBROUTINE ADVEC(NET, NETSU, Z8H, TIHUP, USUM, VSUM, DXSUM, DYSUM, RSUM,
                                                                               ADVEC
     1 WFZ, TSUM, CAVS, ZCH, ALT, ATP, PRS, RHO, ETA, TMAX,
                                                                               ADVEC
                                                                               ADVEC
     2ICF, JCF, NCF, KBHF, N (A TF, LTIMF, NATF)
C
                                                                               ADVEC
                                                                                       5
С
      H. G. NORMENT, ATMCSFHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                               ADVEC
                                                                                       6
                                                                               ADVEC
С
                                                                             **ADVEC
С
                                                                               ADVEC
C
C
      FALLOUT PARCELS ARE TRANSPORTED (VIA SR TRANP) BY ADVECTION PLUS
                                                                               ADVEC 10
      SETTLING. PARCEL TOF AND BASE ARE TRANSPORTED SEPARATELY, AND THE ADVEC 11
C
      RESULTS ARE SMEARED. THE /COMMON/ VARIABLE ZP IS REDLFINED.
                                                                               ADVEC 12
                                                                               ADVEC 13
                                                                             **ADVEC 14
                                                                               ADVEC 15
      COMMON /CNTROL/ IPOUT, ISIN, ISOUT, JPARN, MC(20), NSEQO
                                                                               ADVEC 16
      COMMON /PARCL/ CROSS, DOWN, DWAF, EDDY, NOATP, PMAS, FSIZ, RHOP, RWAF,
                                                                               ADVEC 17
                                                                               ADVEC 18
     1 TP, XP, YP, ZLOW, ZP
                                                                               ADVEC 19
      COMMON /SPACE/ WIN1, XLLC, YLLC, ZMAX, ZMIN, TIMEX
                                                                               ADVEC 20
      DIMENSION NET (ICF, JCF), NETSU (NCF), ZBH (KBHF), USUM (KBHF, ND ATF, LT1MF) ADVEC 21
      DIMENSION VSUM(KBHF, NDATF, LTIMF), DXSUM(KBHF, NDATF, LTIMF)
                                                                               ADVEC 22
                                                                               ADVEC 23
      DIMENSION DYSUM(KBHF, NDATF, LTIMF), TIMUF(LTIMF), ZCH(KBHF)
      DIMENSION CAVS(KBHF), WFZ(KBHF, NDATF, LTIMF), TSUM(KBHF)
                                                                               ADVEC 24
      DIMENSION RSUM(KBHF, NDATF, LTIMF)
                                                                               ADVEC 25
      DIMENSION ALT(NATF), ATP(NATF), PRS(NATF), PHO(NATF), ETA(NATF)
                                                                               ADVEC 26
```

```
C
                                                                             ADVEC 27
      DATA EPS/0.1/
                                                                             ADVEC 28
C
                                                                             ADVEC 29
      MC3=MC(3)
                                                                             ADVEC 30
CHANGE ZP FROM PARCEL CENTER TO PARCEL BASE ALTITUDE.
                                                                             ADVEC 31
      ZP=ZLOW
                                                                             ADVEC 32
CALCULATE TRANSPORT OF PARCEL BASE.
                                                                             ADVEC
                                                                                    3.3
              (ZP-ZMIN).GT.EPS) GO TO 1411
                                                                             ADVEC 34
      TOL =TP
                                                                             ADVEL
                                                                                    35
      XOL = XP
                                                                             ADVEC 36
      YOL =YP
                                                                             ADVEC 37
      ZOL = ZP
                                                                             ADVEC 38
      ROL=0.
                                                                             ADVEC 39
      SIGXL=RWAF
                                                                             ADVEC 40
      SIGYL=RWAF
                                                                             ADVEC 41
      GO TO 1412
                                                                             ADVEC 42
 1411 CALL
                  TRANP (NET, NETSU, ZBH, TIMUP, USUM, VSUM, DXSUM, DYSUM, RSUM,
                                                                             ADVEC 43
     1HFZ,CAVS,TSUN,TMAX,XCL,YOL,ZOL,TOL,SIGXL,SIGYL,RCL,NDATL,
                                                                             ADVEC 44
     2ICF, JCF, NCF, KBHF, NDATF, LTIMF)
                                                                             ADVEC 45
CHANGE ZP FROM PARCEL BASE TO PARCEL TOP ALTITUDE.
                                                                             ADVEC 46
 1412 ZP=ZLOW+DWAF
                                                                             ADVEC 47
CALCULATE TRANSPORT OF PARCEL TOP.
                                                                             ADVEC 48
      IF( ZP-ZMIN .GT.EPS) GO TO 1414
                                                                             AUVEC 49
      TOU=TP
                                                                             ADVEC 50
      XOU=XP
                                                                             ADVEC 51
      YOU=YP
                                                                             ADVEC 52
      ZOU=ZP
                                                                             ADVEC 53
      ROU=0.
                                                                              ADVEC 54
      SIG XU=R WAF
                                                                             ADVEC 55
      SIGYU=RWAF
                                                                             ADVEC 56
      GO TO 1415
                                                                             ADVEC 57
                  TRANP(NET, NETSU, ZBH, TIMUP, USUM, VSUM, DXS LM, DYSUM, RSUM,
 1414 CALL
                                                                             ADVEC 58
     1 WFZ, CAVS, TSUM, TMAX, XCU, YOU, ZOU, TOU, SIGXU, SIGYU, RCU, NDATU,
                                                                              ADVEC 59
     2ICF, JCF, NCF, KBHF, NCATF, LTIMF)
                                                                             ADVEC 60
CALCULATE SMEAR OF PARCEL TOP AND BASE RESULTS.
                                                                              ADVEC 61
 1415 ZOUTN=(ZOL+ZOU)/2.
                                                                             ADVEL 62
      TOUTN=(TOL+TOU)/2.
                                                                             ADVEC
                                                                                   63
       IF(ABS(XOU-XOL).GE.1.0E-30) GO TO 1404
                                                                             ADVEC
                                                                                    64
      IF(ABS(YOU-YOL).GE.1.0E-30) GO TO 1403
                                                                             ADVEC 65
      ROUTN=0.
                                                                              ADVEC 66
      GO TO 1405
                                                                             ADVEC 67
 1403 ROUTN=1.57079633
                                                                              ADVEC 68
      GO TO 1405
                                                                              ADVEC 69
 1404 ROUTN=ATAN((YOU-YOL)/(XOU-XOL))
                                                                              ADVEC 70
      IF (XOU-XOL .LT. 0.1) ROUTN=ROUTN - SIGN(3.141592654, ROUTN)
                                                                             ADVEC 71
 1405 R=ROUTN-ROL
                                                                              ADVEC 72
       SXL=1./SQRT((COS(R)/SIGXL)**2+(SIN(R)/SIGYL)**2)
                                                                             ADVEC 73
       SYL=1./SQRT((SIN(R)/SIGXL)**2+(COS(R)/SIGYL)**2)
                                                                              ADVEC 74
                                                                                   75
      R=ROUTN-ROU
                                                                             ADVEC
      SXU=1./SQRT((COS(R)/SIGXU) *+2+(SIN(R)/SIGYU) **2)
                                                                              ADVEC 76
      SYU=1./SQRT ((SIN(R)/SIGXU) **2+(COS(R)/SIGYU) **2)
                                                                              ADVEC 77
       SXOTN=(SXU+SXL+SQRT((XOU-XOL)**2+(YOU-YOL)**2))/2.
                                                                              ADVEC 78
       SYOTH=SQRT(SYU*SYL)
                                                                             ADVEC 79
      XOUTN=XOL+(SXOTN-SXL)*COS(ROUTN)
                                                                             ADVEC 80
       YOUTN=YOL+(SXOTN-SXL)+SIN(ROUTN)
                                                                             ADVEC 81
 1450 CALL OUMPER(XOUTN, YCLTN, ZOUTN, TOUTN, SXOTN, SYCTN, PMAS, PSIZ, ROUTN, J, ADVEC 82
     1ISOUT, IPOUT, HC3)
                                                                             ADVEC 53
      RETURN
                                                                              ADVEC 84
      END
                                                                              ADVEC 85
```

```
BOUN
*DECK.BOUN
      SUBROUTINE BOUN (NET, NETSU, XT, YT, XU, YO, XC, YC, ICF, JCF, NCF)
                                                                             BOUN
C
                                                                              BOUN
                                                                                     3
      MARCH, 1971
      SUBROUTINE BOUN DETERMINES AN INTERPOLATED PARCEL POSITION
                                                                              BOUN
      (INFINITESMALLY DISPLACED EXTERNAL TO A CELL BOUNDARY) GIVEN THE
                                                                             BJUN
      PREVIOUS PARCEL FOSITION INTERNAL TO THIS CELL AND THE ANTICIPATEDBOUN
                                                                                     7
      PARCEL POSITION EXTERNAL TO THIS CELL
                                                                             BOUN
            - ANTICIPATED FARCEL POSITION X COORDINATE
                                                                             BOUN
      XT
            - ANTICIPATED PARCEL POSITION Y COCRDINATE
                                                                              BOUN
      YT
            - PREVIOUS PARCEL POSITION X COORDINATE
                                                                              BOUN
                                                                                    10
      XO
                                                                              BOUN
      YO
            - PREVIOUS PARCEL FOSITION Y COORDINATE
                                                                                    11
                                                                              BOUN
                                                                                    12
C
            - INTERPOLATED PARCEL POSITION X CCGRDINATE
      XC
C
      YC
             - INTERPOLATED PARCEL POSITION Y COORDINATE
                                                                              BOUN
                                                                                    13
      ADISP - SMALL X DISPLACEMENT. + CR - EPS.
                                                                              BOUN
                                                                                    14
      BDISP - SHALL Y DISPLACEMENT. + OR - EPS.
                                                                              BOUN
                                                                                    15
                                                                              BOUN
      DIMENSION NET(ICF, JCF), NETSU(NCF)
                                                                                    16
                                                                              BOUN
                                                                                    17
      DATA EPS/0.5/
                                                                              BOUN
CLEAR ADISP AND BDISP
                                                                                    18
                                                                              BOUN
                                                                                    19
      ADISP=0.
                                                                              BOUN
      BDISP=0.
COMPUTE XL, XR, YL, AND YU FCR (XO, YO)
                                                                              BOUN
                                                                                    21
                                                                              BOUN
      CALL NEST(NET, NETSU, XO, YO, NDATO, XL, XR, YL, YU, ICF, JCF, NCF)
                                                                                    22
                                                                              BOUN
                                                                                    23
CUT AND TRY XC
CHECK IF XT LIES TO THE RIGHT OF XR
                                                                              BOUN
                                                                                    24
      IF(XT.LE.XR) GO TO 102
                                                                              BOUN
                                                                                     25
      XC=XR
                                                                              BOUN
                                                                                    26
                                                                              BUUN
      ADISP=EPS
                                                                                    27
                                                                              BOUN
                                                                                    28
      GO TO 104
CHECK IF XT LIES TO THE LEFT OF XL
                                                                              BOUN
                                                                              BOUN
                                                                                     36
  102 XC=XL
                                                                              BOUN
      IF(XT.GE,XL) GO TO 106
                                                                                     31
                                                                              BOUN
      ADISP=-EPS
                                                                                     32
COMPUTE YO
                                                                              BOUN
                                                                                     33
  104 YC=YO+(YT-YO)*(XC-XO)/(XT-XO)
                                                                              BOUN
                                                                                     34
CHECK IF YC LIES BETHEEN YL AND YU
                                                                              BOUN
                                                                                     35
                                                                              BOUN
       IF((YU.GE.YC).AND.(YC.GE.YL)) GO TO 111
                                                                                     36
                                                                              BOUN
                                                                                     37
CUT AND TRY YC
                                                                              BOUN
CHECK IF YT LIES ABOVE YU
                                                                                     38
                                                                              BOUN
      IF(YT.LT.YU) GO TO 108
                                                                              BOUN
                                                                                     49
       YC=YU
                                                                              ROUN
  107 BDISP=EPS
                                                                                     41
       GO TO 110
                                                                              BOUN
                                                                                     42
                                                                              80UN
CHECK IF YT LIES BELOW YL
                                                                              BOUN
  108 YC=YL
                                                                                     44
                                                                              BOUN
                                                                                     45
       IF(YT.GT.YL) GO TO 111
                                                                              BOUN
                                                                                     46
       BDISP=-EPS
                                                                              BOUN
                                                                                     47
COMPUTE XC
  110 XC=XO+(XT-XO)*(YC-YG)/(YT-YO)
                                                                              BOUN
                                                                                     48
CREATE INFINITESMAL DISPLACEMENT
                                                                              BOUN
                                                                                     49
  11 1 XC=XC+ADISP
                                                                              BCUN
                                                                                     50
                                                                              BOUN
                                                                                     51
       YC=YC+BDISP
                                                                              BOUN
                                                                                     52
       RETURN
                                                                              BOUN
       END
```

The state of the s

```
SUBROUTINE CALIB (A, NX, AN, NS, N)
                                                                             CALIB
C
      MARCH. 1971
                                                                             CALIB
      SUBROUTINE CALIB DETERMINES A JUSTIFIED INDEX WHICH RELATES AN
C
                                                                             CALIB
      INPUT DATA POINT TO ITS CORRESPONDING POSITION IN AN INPUT ARRAY. CALIB
C
C
                                                                             CALIB
C
             - INPUT DATA ARRAY
                                                                             CALIB
C
      NX
              INPUT MAXIMUM INCEX OF A
                                                                             CALIB
                                                                                     8
                                                                             CALIB
C
      AN
              INPUT DATA FOINT
                                                                                     Q
             - INDEX JUSTIFICATION CODE.
                                             WHEN GIVEN (BY INPUT) THE
                                                                             CALIB 10
C
      NS
             FOLLOWING VALUES, N IS DETERMINED SUCH THAT -
                                                                             CALIB 11
C
               +1 A(N) IS .LE. AN
C
                                                                             CALIB 12
               -1 A(N) IS .GT. AN
C
                                                                             CALIB 13
C
             - OUTPUT INDEX
                                                                             CALIS 14
                                                                             CALIB 15
                                                                             CALIB 16
      DIMENSION A(NX)
      EPS = 1.E-6 * NS * ABS( AN )
                                                                             CALLB 17
                                                                             CALIB 18
      N=0
                                                                             CALIB 19
COMMENCE SEARCH FOR N
    1 N=N+1
                                                                             CALIB 20
      NN=N+(1+NS)/2
                                                                             CALIB 21
COMPARE A(NN) WITH AN ONLY IF NN IS LESS THAN NX+1
                                                                             CALIB 22
                                                                             CALIB 23
      IF((NN.LT.NX+1).ANC.(A(NN).LT.AN+EPS)) GO TO 1
      RETURN
                                                                             CALIB 24
      END
                                                                             CALIB 25
                                                                             CNTR
*DECK. CNTR
                                                                                     2
      SUBROUTINE CNTR(NET.NETSU.NDATA,XG.YG.ICF.JCF.NCF)
                                                                             CNTR
                                                                                     3
                                                                             CNTR
      MARCH, 1971
C
      SUBROUTINE CNTR DETERMINES THE X,Y COORDINATES AT THE CENTER OF A CNIR
C
      HORIZONTAL SPACE RESCLUTION HESH OR SUB-MESH.
                                                                             CMTR
¢
      NDATA - ATMOS. HORIZ. SPACE NET MESH OR SUB-MESH INDEX
                                                                             CNTR
             - NET MESH OR SUB-MESH CENTER POSITION X COORDINATE
                                                                                     7
                                                                             CNTR
                                                                                     8
                                                                             CNTR
             - NET MESH OR SUB-MESH CENTER POSITION Y COORDINATE
      COMMON /CNTROL/ IPOUT.ISIN, 1SOUT, JPARN, MC(28), NSEQO
                                                                             CNTR
                                                                                     9
      COMMON /INDEX/ ICX, JCX, KBHX, LTIMX, NAT, NCX, NDATX
                                                                             CNTR
                                                                                    10
      COMMON /SPACE/ WINT, XLLC, YLLC, ZMAX, ZMIN, TIMEX
                                                                             CNTR
                                                                                    11
      DIMENSION NET (ICF, JCF), NETSU(NCF)
                                                                             CNTR
                                                                                    12
                                                                             CNTR
                                                                                    13
      DATA PROGRM/6HCNTR /
                                                                             CNTR
      VINT=WINT/2"
                                                                                    14
                                                                             CNTR
                                                                                    15
      I G = 3
                                                                             CNTR
                                                                                    16
      JG=0
                                                                             CNTR
                                                                                    17
      NOBLE=1
      NSTOR=NDATA
                                                                             CNTR
                                                                                    18
                                                                             CNTR
                                                                                    19
COMMENCE SEARCH LOOPS FOR IC AND JC
                                                                             CNTR
                                                                                    20
    1 DO 2 JC=1, JCX
                                                                             CNTR
                                                                                    21
      DO 2 IC=1, ICX
CHECK IF NSTOR CAN BE FOUND IN NET
                                                                             CNTR
                                                                                    22
                                                                             CNTR
                                                                                    23
      IF (NET (IC. JC) . EQ. NSTCR) GU TO 9
                                                                             CNTR
                                                                                    24
      CONTINUE
                                                                                    25
COMMENCE SEARCH LOOP FOR NO
                                                                             CNTR
                                                                             CNTR
      DO 3 NC=1, NCX
                                                                                    26
CHECK IF NSTOR CAN BE FOUND IN NETSU
                                                                             CNTR
                                                                                    27
                                                                             CNTR
      IF (NETSU(NC). EQ. NSTOR) GO TO 4
                                                                                    28
                                                                             CNTR
                                                                                    29
      CONTINUE
```

CALIB

CNTR

30

*DECK, CALIB

CALL ERROR (PROGRM, -3 ISOUT)

```
COMMENCE TRACEBACK THROUGH POINTER SEQUENCE
                                                                               CNTR
                                                                                     31
    4 NG=NC-4*(NC/4)+1
                                                                               CNTR
                                                                                     32
      ING=+1
                                                                               CNTR
                                                                                     33
      JNG=-1
                                                                               CNTR
CONVERT NSTOR TO ITS IMMEDIATELY PRECEDING POINTER
                                                                               CNTR
                                                                                     35
      NSTOR=-NC+3
                                                                               CNTR
                                                                                     36
      GO TO (8,7,6,5), NG
                                                                               CNTR
                                                                                     37
    5 ING=ING+2
                                                                               CNTR
                                                                                      38
      NSTOR=NSTOR+1
                                                                               CNT()
                                                                                     39
    6 JNG=JNG+2
                                                                               CNTF
                                                                                      40
      NSTOR=NSTOR+1
                                                                               CNTF
                                                                                      41
    7 ING=ING-2
                                                                               CNTR
                                                                                      42
      NSTOR=NSTOR-3
                                                                               CNTR
                                                                                      43
COMPLTE QUORANT LABELS IG AND JG
                                                                               CNTR
                                                                                      44
    8 IG=IG+ING*NDBLE
                                                                               CNTR
                                                                                      45
      JG=JG+JNG*ND8LE
                                                                               CNTR
                                                                                     46
      NDBLE=2*NDBLE
                                                                               CNTR
                                                                                      47
      VINT=VINT/2.
                                                                               CNTR
                                                                                      48
CONTINUE SEARCH FOR IC AND JC
                                                                               CNTR
                                                                                      49
      GO TO 1
                                                                               CNTR
                                                                                      50
COMPUTE XG AND YG
                                                                               CNTR
                                                                                     51
    9 IG=IG+NDBLE
                                                                               CNTR
                                                                                     52
      JG=JG+NDBLE
                                                                                     53
                                                                               CNTR
      XG=WINT*FLOAT(IC+1) +VINT*FLOAT(IG) +XLLC
                                                                               CNTR
                                                                                     54
      YG=WINT*FLOAT(JC-1) + VINT*FLOAT(JG) +YLLC
                                                                               CNTR
                                                                                     55
      RETURN
                                                                               CNTR
                                                                                     56
      END
                                                                               CNTR
                                                                                     57
```

```
*DECK, DATIN
                                                                             DATIN
      SUBROUTINE DATIN (NET, NETSU, ZBH, ZCH, TIMUP, USUM, VSUM, RSUM, WFZ,
                                                                             DATIN
     10XSUM, DYSUM, CAVS, MARY, ICF, JCF, NCF, MARF, KBHF, NDATF, LTIMF)
                                                                             DATIN
                                                                                     3
                                                                             DATIN
      H. G. NORMENT. ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                             DATIN
                                                                                     5
                                                                             DATIN
                                                                                     6
                                                                        ****DATIN
                                                                             DATIN
C
      READS AND PROCESSES WIND DATA. READS AND PROCESSES TURBULENCE
                                                                             DATIN
      DATA, OR CALCULATES TURBULENCE DATA. CALLS SUBFOUTINES ONEDIN,
                                                                             DATIN 10
      TRIDIN AND WILKNS FOR ASSISTANCE.
                                                                             DATIN 11
                                                                             DATIN 12
                                                                            *DATIN 13
                                                                             DATIN 14
      COMMON /CNTROL/ IPOUT, ISIN, ISOUT, JPARN, MC(20), NSEQO
                                                                             DATIN 15
      COMMON /INDEX/ ICX, JCX, KBHX, LTIMX, NAT, NCX, NDATX
                                                                             DATIN 16
C
                                                                             DATIN 17
      INTEGER WIND, TURB, ME TEOR, RESOLV, SPEC, FORM, DONE, WILKS
                                                                             DATIN 16
      DIMENSION NET(ICF, JCF), NETSU(NCF), MARY (MARF), ZBH (KBHF), ZCH (KBHF)
                                                                             DATIN 19
      DIMENSION TIMUP(LTIFF), USUM (KBHF, NDATF, LTIMF)
                                                                             DATIN 20
      DIMENSION VSUH(KBHF, NDATF, LTIMF), WFZ(KBHF, NDATF, LTIMF)
                                                                             DATIN 21
      DIMENSION DXSUM(KBHF,NDATF,LTIMF),DYSUM(KBHF,NDATF,LTIMF)
                                                                             DATIN 22
      DIMENSION RSUM(KBHF, NDATF, LTIMF)
                                                                             DATIN 23
C
                                                                             DATIN 24
      DATA PROGRM , ALIMIT , WIND , TURB , DONE , METEOR, RESOLV
                                                                             DATIN 25
       /6HDATIN ,999999.,4HWIND,4HTUR3,4HNO M,4HMETE,4HRESO/
                                                                             DATIN 26
      DATA INPU
                   , WILKS
                                                                             DATIN 27
     1 /4HINPU
                   ,4HHILK
                                                                             DATIN 28
```

```
DATIN 29
C
                                                                           DATIN 30
     FORMAT(A4, 2X, A4, 18X, 12, F10.0)
   10 FORMAT(///15X17HATMCSPHERE UPDATE14, 22H FOR TIMES LATER THAN,
                                                                          DATIN 31
     1 E12.5, 6H SEC (F8.3, 7H HOURS)/)
                                                                           DATIN 32
   11 FORMAT(21X50H* + + + + + + + WINDFIELD DATA + + + + + + + + + + + ) DATIN 33
   12 FORMAT(21X51H# # # # # # # # # TURBULENCE DATA # # # # # # # #/)DATIN 34
  21 FORMAT(1H0,10X, 79HCOUNT OF UPDATA DATA SETS DOES NOT TALLY WITH DATIN 35
     1SPECIFIED UPDATE SECUENCE NUMBERS)
                                                                           DATIN 36
    FORMAT(1H0,10X, 22H A DATA SET IS MISSING)
                                                                           DATIN 37
                        59HUFDATE INDEX INCONSISTENT WITH UPDATE TIME ON DATIN 38
   23 FORMAT(///20%.
     1AN INPUT CARD)
                                                                           DATIN 39
   25 FORMAT( 1HO, 81HFIRST UPDATE WINDS MUST BE INPUT FIRST WHEN 1-DIMEDATIN 40
     1NSIONAL DATA PROCESSING IS USED)
                                                                           DATIN 41
                                                                           DATIN 42
C
      00 50 L=1.LTIMF
                                                                           DATIN 43
                                                                           DATIN 44
      TIMUP(L)=ALIHIT
                                                                           DATIN 45
      DO 50 N=1.NDATE
      USUM(1,N,L) = AL IMIT
                                                                           DATIN 46
                                                                           DATIN 47
      DXSUM(1,N,L)=ALIMIT
                                                                           DATIN 48
      ZCH(1)=ALIHIT
                                                                           DATIN 49
      IF(MC(1).EQ.0)GO TO 500
CONSTRUCT THE HORIZONTAL SPACE RESULUTION NET
                                                                           DATIN 50
                 GETUP (NET, NETSU, MARY, MARF, ICF, JCF, NCF, NDATF)
                                                                           DATIN 51
      CALL
                                                                           DATIN 52
CONSTRUCT THE ATMOSPHERE STRATA
                                                                           DATIN 53
      CALL
                 LAYERS (ZCH, ZBH, KBHF)
      GO TO 1000
                                                                           DATIN 54
                                                                           DATIN 55
 500
      ICX=1
                                                                           DATIN 56
      JCX≃1
                                                                           DATIN 57
      NDATX=1
                                                                           DATIN 58
      NET(1,1)=1
COPY IN DATA SET SPECIFICATIONS
                                                                           DATIN 59
                                                                           DATIN 60
 1000 LTIMX=0
 1002 READ(ISIN,1)SPEC, FORM, LTIM, UPTIMH
                                                                           DATIN 61
      IF(SPEC.EQ.DONE)GO TC 3000
                                                                           DATTN 62
 1003 IF(LTIM.LT.1.0R.LTIM.GT.LTIMF)CALL ERROR (FROGRM:-1983;ISOUT)
                                                                           DATIN 63
                                                                           DATEN 64
      UPTIMS=UPTIMH* 3600.
 1004 IF(TIMUP(LTIM) .NE. ALIMIT) IF(TIMUP(LTIM)-UPTIMS)5003,1050,5003
                                                                           DATIN 65
      TIMUP(LTIM) = UPTIMS
                                                                           DATIN 66
 1050 IF MC(2) .NE. 1) WRITE(ISOUT, 10) LTIM, UPTIMS, UPTIMH
                                                                           DATIN 67
CHECK IF UPDATE 1 WINDS ARE INFUT FIRST WHEN 1-D PROCESSING IS SPECIFIEDDATIN 68
 1051 IF(LTIM .GT. 1 .OR. SPEC .EQ. TUR3 .AND. MC(1) .EQ. 0)
                                                                           DATIN 69
                                                                           DATIN 70
       IF(LTIMX-1)1052,1653,1653
                                                                           DATIN 71
      GO TO 1053
                                                                           DATIN 72
 1052 WRITE (ISOUT, 25)
      CALL ERROR(PROGRM,-1052, ISOUT)
                                                                           DATIN 73
 1053 IF(SPEC.EQ.TUR8)GO TO 2000
                                                                           DATIN 74
                                                                           DATIN 75
 1055 IF (SPEC.NE.WIND) CALL ERROR (PROGRY,-1055, ISOUT)
CONSTRUCT WINE DATA ARRAYS
                                                                           DATIN 76
       IF(MC(2) .NE. 1) WRITE(ISOUT,11)
                                                                           DATIN 77
                                                                           DATIN 78
      LTIMX=LTIMX+1
  1060 IF(LTIMX.GT.LTIMF)CALL ERROR(PROGRM,-1.60,ISCUT)
                                                                           DATIN 79
       IF (MC (1) .NE. 8) GO TO 1109
                                                                           DATIN 30
CONSTRUCT AIND DATA ARRAYS VIA THE SIMPLIFIED 1-DIMENSIONAL METHOD
                                                                           DATIN 81
      CALL
                  ONEDIN(ZCH,ZBH,CAVS,USUM ,VSUM ,LTIM,KBHF,NDATF,LTIMF, DATIN 32
     1 FORM, SPEC)
                                                                           DATIN 83
                                                                           DATIN 84
       DO 1070 N=1.NDATX
                                                                           DATIN 55
       00 1070 K=1,KBHX
 1070 WFZ(K.N.LTIM)=0.0
                                                                           DATIN 36
                                                                           DATIN 87
      GO TO 1200
CONSTRUCT THE WIND DATA ARRAYS VIA THE 3-DIMENSIONAL METHOD
                                                                           DATIN 88
```

make the specification of a total control with a state of the specific control of the specification of the specifi

```
1100 CALL
                 TRIDIN(NET,NETSU,ZCH,USUM,VSUM,WFZ,LTIM;ICF,JCF,NCF, DATIN 59
     1KBHF, NDATF, LTIMF, FORM, SPEC)
                                                                            DATIN 90
COMPUTE WIND DIRECTION ANGLE ARRAYS
                                                                            DATIN 91
 1200 CONTINUE
                                                                            DATIN 92
      DO 1300 N=1.NDATX
                                                                            DATIN 93
      DO 1300 K=1,KBHX
                                                                            DATIN 94
      IF (ABS (USUM(K, N, LTIM)). GE. 1. DE-30) GO TO 1254
                                                                            DATIN 95
      IF (ABS(VSUM(K,N,LTIM)).GE.1.0E-30)GO TO 1253
                                                                            DATIN 96
      RSUM(K,N,LTIM)=0.0
                                                                            DATIN 97
      GO TO 1300
                                                                            DATIN 98
 1253 RSUM(K, N, LTIM) = SIGN(1.57079633, VSUM(K, N, LTIM))
                                                                            UATIN 99
      GO TO 1300
                                                                            DATIN100
 1254 RSUM(K,N,LTIM)=ATAN(VSUM(K,N,LTIM)/USUM(K,N,LTIM))
                                                                            DATIN1:1
      IF(USUM(K,N,LTIM) \cdot LT \cdot 0 \cdot 0) RSUM(K,N,LTIM) = RSUM(K,N,LTIM) -
                                                                            DATIN1J2
       SIGN(3.141592654, RSUM(K, N, LTIM))
                                                                            DATIN103
 1300 CONTINUE
                                                                             DATIN134
      GO TO 1002
                                                                             DATIN115
CONSTRUCT THE TURBULENCE DATA ARRAYS
                                                                             DATIN106
 2000 IF(MC(2) .NE. 1) WRITE(ISOUT,12)
                                                                             DATIN117
      IF (FORM .EQ. INPU) GC TO 2100
                                                                             DATIN138
 2001 IF(FORM .NE. WILKS ) CALL ERROR(PROGRM, -2001, ISOUT)
                                                                             DATIN119
CALCULATE TURBULENCE DATA BY WILKINS' FUNCTION OF RECIPROCAL ALTITUDE.
                                                                             DATIN11C
      TURBULENCE WILL BE HCRIZONTALLY UNIFORM.
                                                                             DATIN111
                  WILKNS (ZCH, DXSUM, DYSUM, CAVS, TIMUP, KBHF, NDATF, LTIMF,
      CALL
                                                                             DATIN112
     1 LTIM)
                                                                             DATIN113
      GO TO 1002
                                                                             DATIN114
 2100 FORM=RESOLV
                                                                             DATIN115
      IF (MC(1) .NE. 0) GO TO 2200
                                                                             DATIN116
CONSTRUCT THE TURBULENCE DATA ARRAYS VIA THE SIMPLIFIED 1-DIMENSIONAL
                                                                             DATIN117
                                                                             DATIN118
      METHOD
      CALL
                  ONEDIN(ZCH, ZBH, CAVS, DXSUH, DYSUM, LTIM, KBHF, NDATF, LTIMF, UATIN119
     1 FORM, SPEC)
                                                                             DATIN120
      GO TO 1002
                                                                             DATIN121
CONSTRUCT THE TURBULENCE DATA ARRAYS VIA THE 3-DIMENSIONAL METHOD
                                                                             DATIN122
 2200 CALL
                 TRIDIN(NE1,NETSU,ZCH,DXSUM,DYSUM,DUP,LTIM,ICF,JCF,NCF, DATIN123
     1 KBHF, NDATF, LTIMF, FCRM, SPEC)
                                                                             DATIN124
                                                                             DATIN125
      GO TO 1862
 3000 CONTINUE
                                                                             DATIN126
CHECK DATA FOR ERRORS
                                                                             DATIN127
      LTIM=0
                                                                             DATIN128
      00 3100 L=1.LTIMF
                                                                             DATIN129
      IF(TIMUP(L).EQ.ALIMIT)GO TO 3100
                                                                             DATIN130
      LTIM=LTIM+1
                                                                             DATIN131
 3100 CONTINUE
                                                                             DATIN132
      IF(LTIM.EQ.LTIMX)GO TO 3200
                                                                             DATIN133
      WRITE(ISOUT, 21)
                                                                             DATIN134
 3105 CALL ERROR (PROGRM, -3105, ISOUT)
                                                                             DATIN135
 3200 DO 3250 L=1.LTIMX
                                                                             DATIN136
                                                                             DATIN127
      DO 3250 N=1.NDATX
      IF(USUM(1,N,L).EG.ALIMIT.OR.OXSUM(1,N,L).EQ.ALIMIT)GO TO 3275
                                                                             DATIN138
 3250 CONTINUE
                                                                             DATIN139
      RETURN
                                                                             DATIN140
 3275 WRITE (ISOUT, 22)
                                                                             DATI N141
 3276 CALL ERROR (PROGRM, - 3276, ISOUT)
                                                                             DATIN142
 5003 WRITE(ISOUT,23)
                                                                             DATIN143
                                                                             DATIN144
      CALL ERROR(PROGRM, -1004, ISOUT)
                                                                             DATIN145
```

```
*DECK, DTMEX
                                                                           DIMEX
      SUBROUTINE DIMEX (NUMTAP)
                                                                           DIMEX
C
                                                                           DIMEX
C
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                           DIMEX
                                                                           DIMEX
C
                                                                    ******DTMEX
                                                                           DIMEX
C
                        DIFFUSIVE TRANSPORT HOULLE
                                                                           DIMEX
                                                                           DIMEX
C
      ARRAY DIHENSIONS MUST BE SET IN THIS PROGRAM. THESE ARE MAXIMUM
                                                                           DTMEX 10
C
C
      DIMENSIONS TO BE USED IN THIS RUN. DIMENSION MNEMONICS AND THE
                                                                           DINEX 11
C
      DATA FIELD LENGTHS THEY CONTROL ARE AS FOLLOWS -
                                                                           DIMEX 12
       ICF. JCF- PRIMARY HCRIZONTAL SPACE RESOLUTION NET INDICES
                                                                           DIMEX 13
                 (ARRAY NET)
                                                                           DIMEX 14
                 ICF IS THE NUMBER OF EAST-WEST NET SUBDIVISIONS
                                                                           DTMEK 15
C
C
                 JCF IS THE NUMBER OF NORTH-SOUTH NET SUBDIVISIONS
                                                                           DIMEX 16
С
       KBHF
              - ATMOSPHERE STRATA FOR WIND AND TURBULENCE DATA
                                                                           DIMEX 17
C
                 (ARRAYS USUM, VSUM, WFZ, DXSUM, DYSUM, RSUM, TSUM, ZBH, ZCH,
                                                                           DTMEX 18
C
                  GAVS. WAVG)
                                                                           UTMEX 19
              - WIND AND TURBULENCE DATA UPDATES (INCLUDING INITIAL DATA) DTMEX 20
C
       LTIME
С
                 (ARRAYS USUM, VSUM, WFZ, DXSUM, DYSUM, RSUM, WAVG, HDAV)
                                                                           DIMEX 21
C
       MARF
                DIMENSION OF THE ARRAY (MARY) THAT RECIEVES THE FLAGS
                                                                           DINEX 22
C
                 WHICH DEFINE THE HORIZONTAL SPACE RESOLUTION NET
                                                                           DTMEX 23
C
       NATE
               - ATMOSPHERE STRATA FOR, PRES, TEMP, TTC. (ALWAYS 256)
                                                                           DIMEX 24
              - HORIZONTAL SPACE RESOLUTION NET AND JUB-NET MESHES
C
       NOATE
                                                                           DTHEX 25
                                                                           DTMEX 26
C
                 (ARRAYS LSUM, VSUM, WFZ, DXSUM, DYSUM, RSUM)
С
       NCF
              - HORIZINTAL SFACE RESOLUTION NET MESH SUBGIVISIONS
                                                                           DIMEX 27
C
                 (ARRAY NETSU)
                                                                           DTHEX 28
C
                                                                           DIMEX 29
                     raxaaaaaaaaaaaa GLOSSNRY **********************************
                                                                           DIMEX 31
            - ALTITUDES FOR ATMOS. DENSITY AND VISCUSITY TABLE
C
      ALT
                                                                           DINEX 32
            - PARTICLE FALL RATE FOR EACH ATMOS. STRATUM
                                                                           DIMEX 33
C
      CAVS
      CROSS - CROSSHING CRCSSING TRAJECTORIES CORRECTION TO DISPERSION
C
                                                                           DTMEX 34
C
      DOWN
            - DOWNWIND CROSSING TRAJECTORIES CORRECTION TO DISPERSION
                                                                           OTMEX 35
            - PARCEL VERT. THICKNESS BEFORE ADVECTION
                                                                           DIMEX 36
      DXSUM - TURBULENCE X COMPONENT (HEIGHTED SUM) 3-CIM. DATA ARRAY
                                                                           DIMEX 37
      DYSUM - TURBULENCE Y COMPONENT (HEIGHTED SUM) 3-DIM. DATA ARRAY
                                                                           DTMEX 38
                                                                           DTMEX 39
           - RATIO OF LAGRANGIAN TO EULERIAN TIME SCALES.
                                                              SET TO 4.0
C
               BY PGM. IF INPUT AS ZERO.
                                                                           DINEX 40
C
              DYNAMIC VISCOSITY OF AIR
Ç
      ETA
                                                                           DTMEX 41
            - PARTICLE SETTLING RATE AT MID ATMOSPHERE ALTITUDE
      FAV
                                                                           DTMEX 42
      VACH
              AVERAGE HORIZONTAL DIFFUSIVITY OR TURBULENCE DISSIPATION
                                                                           DIMEX 43
               RATE FOR EACH ATMOSPHERE UPDATE.
                                                                           DIMEX 44
      ICF
              MAX. FORMAL CIM. CURRESPONDING TO ICX
                                                                           DIMEX 45
C
             - OBJECT-TIME MAX. NUMBER OF WEST-EAST MESHES IN ARRAY MET
                                                                           DIMEX 46
C
      TCX
      IPOUT - LOGICAL UNIT NUMBER OF DIFF. TRANS. MOD. OUTPUT TAPE
                                                                           DIMEX 47
C
            - LOGICAL UNIT NUMBER OF SYSTEM INFUT TAPE
      ISIN
                                                                           DTMEX 48
      ISOUT - LOGICAL UNIT NUMBER OF SYSTEM OUTPUT TAFE
                                                                           DIMEX 49
      JPARN - LOGICAL UNIT NUMBER OF ICRM OUTFUT TAPE
                                                                           DIMEX 50
             - MAX. FORMAL CIM. CORRESPONDING TO JCX
                                                                           DTMEX 51
C
       JCF
             - OBJECT-TIME FAX. NUMBER OF SOUTH-NORTH MESHES IN ARRAY NETDTMEX 52
       JCX
C
      KBHF
            - MAX. FORMAL (IM. CURRESPONDING TO KBHX
                                                                           DIMEX 53
            - OBJECT-TIME MAX. ATMOSPHERE LAYER INDEX FOR WIND AND TURB. DTMEX 54
      KBHX
      LTIME
            - MAX. FORMAL CIM. CORRESPONDING TO LTIMX
                                                                           DIMEX 55
                                                                           DTMEX 56
      LTIMX - OBJECT-TIME MAX. INDEX FOR WIND AND TURB. UPCATES
               (INCLUDES THE INITIAL SET)
                                                                           DINEX 57
             - MAX. FORMAL CIM. CORRESPONDING TO MARX
                                                                           DIMEX 58
      MARE
C
             - OBJECT-TIME MAX. DIN. OF ARRAY MARY (MARX=ICX*JCX)
                                                                           DIMEX 59
       MARX
      MARY
             - HORIZ. ATMOS. SPACE RESOLUTION NET MESH AND SUB-MESH
                                                                           DTMEX 60
```

```
CONTROL FLAGS DATA ARRAY
                                                                         DIMEX 61
              - CONTROL INTEGER DATA ARRAY
         MC
  С
                                                                         DTMEX 62
              - NUMBER OF ALTITUDE STRATA IN ATMOS. T.P.RHO, ETC. TABLE
  C
         NAT
                                                                         DTMEX 63
              - MAX. FORMAL DIM. CORRESPONDING TO NAT (SEE ABOVE)
         NATE
                                                                         DIMEX 64
         NBLK
              - RECORD BLOCK SIZE FOR FALLOUT PARCEL DATA ARRAYS
                                                                         DIMEX 65
         NCF
              - MAX. FORMAL (IM. CORRESPONDING TO NCX
                                                                         DTMEX 66
              - OBJECT-TIME MAX. DIM. OF ARRAY NETSU
         NCX
                                                                         DTMEX 67
                 4* (NUMBER OF ZEROS PUNCHED IN MARY INPUT CARDS)
                                                                         DTMEX 68
         NDATE - MAX' FORMAL DIM. CORRESPONDING TO NDATX
   C
                                                                         DIMEX 69
   ¢
         NDATX - NUMBER OF ONES (1) PUNCHED IN MARY INPUT CARDS (1.E.,
                                                                         DYMEX 70
                TOTAL NUMBER OF HORIZONTAL SPACE RESOLUTION MESHES)
   C
                                                                         DTMEX 71
                                                                         OTMEX 72
  C
        NET
              - PRIMARY HORIZONTAL SPACE RESOLUTION MESH ARRAY
                                                                         DIMEX 73
  Ç
         NETSU - HORIZONTAL SFACE RESOLUTION SUB-MESH ARRAY
         NSEQO - STORAGE SEQUENCE INDEX OF FIRST PARCEL TO BE TRANSPORTEDDTMEX 74
   C
         N1, N2, - INPUT DATA POINTERS
                                                                         DTMEX 75
              - CONVERSION FACTOR FROM DEGREES TO RADIANS=PI/180
   C
         RADC
                                                                         DIMEX 76
         RHU
              - ATMOS. DENSITY
                                                                         DTMEX 77
                                                                         DIMEX 78
              - RELATIVE HUMIDITY
   C
         RLH
   C
         RO
              - WIND HEADING ORIENTATION ANGLE AFTER ADVECTION
                                                                         DTMEX 79
         RHOP - FALLOUT PARTICLE DENSITY
                                                                         DIMEX 80
   ¢
         RSUM - WIND HEADING ORIENTATION ANGLE (WEIGHTED SUM) 3-UIM. ARRAYDTMEX 81
   C
   C
         RWAF - PARCEL RADIUS IN PARCEL CENTRAL PLANE BEFORE ADVECTION DTMEX 82
   C
         SIGH - STANDARD DEVIATION OF VERTICAL TURBULENCE (M/SEC)
                                                                         DIMEX 83
         SIGXO - PARCEL DOWNWIND DISPERSION PARAMETER
                                                                         DIMEX 84
   C
         SIGYO - PARCEL CROSSIND DISPERSION PARAMETER
                                                                         DIMEX 85
        TIME - TIME AT ONSET OF CURRENT PARCEL TIME INTERVAL
  C
                                                                         DIMEX 36
        TIMEX - OVERALL TRANSPORT TIME LIMIT
  C
                                                                         DIMEX 07
        TIMUP - ATMOSPHERE UPDATE TIMETABLE DATA ARRAY
  C
                                                                         DTMEX 88
  C
         TMAX - TRANSPORT TIME LIMIT FOR A PARTICLE SIZE CLASS
                                                                         DTMEX 89
  С
         ŤΟ
              - TIME AFTER FARCEL ADVECTION
                                                                         DTMEX 90
         TP
              - TIME BEFORE PARCEL ADVECTION
                                                                         DTMEX 91
         USUM - WIND X COMPONENT (WEIGHTED SUM) 3-DIM. DATA ARRAY
                                                                         DIMEX 92
              - DISPERSION VARIANCE OF A PUFF ABOVE WHICH THE DISPERSION DIMEX 93
  С
         VARL
                RATE BECOMES CONSTANT
                                                                         DIMEX 34
  C
                                                                         DIMEX 95
  C
        VSUM
              - WIND Y COMPONENT (WEIGHTED SUM) 3-DIM. CATA ARRAY
         WAVE - AVG. ATMOS. VERT. WIND FER UPDATE FER STRATUM
                                                                         DTMEX 96
  C
         WAVGK - OVERALL AVERAGE VERTICAL WIND COMPONENT
                                                                         DIMEX 97
  ¢
  C
         HFZ
              - WIND Z COMPONENT 3-DIM. DATA ARRAY
         WINT - MESH INCREMENT OF THE PRIMARY HORIZONTAL SPACE RESOLUTION DIMEX 99
        XLLC - X COORDINATE OF SOUTH-WEST CORNER OF ATMOS. SPACE
  C
                                                                         DTMEX101
              - PARCEL CENTER X COORDINATE AFTER ADVECTION
- PARCEL CENTER X COORDINATE BEFORE ADVECTION
  C
        ΧO
                                                                         DIMEX132
 С
        ΧP
                                                                         DTMEX133
        YLLC - X COORDINATE OF SOUTH-WEST CORNER OF ATMOS. SPACE
                                                                        DIMEX104
 C
        YO
 C
              - PARCEL CENTER Y COORDINATE AFTER ACVECTION
                                                                         DTMEX105
        YP
  C
              - PARCEL CENTER Y COORDINATE BEFORE ADVECTION
                                                                         OTMEX106
       7BH
              - ATMOSPHERE STRATA BASE-ALTITUDE CATA ARRAY
- ATMOSPHERE STRATA MID-ALTITUDE DATA ARRAY
  Ç
                                                                         DTMEX107
       20H
  C
                                                                         DTMEX138
        ZLOW - PARCEL BASE ALTITUDE BEFCRE ADVECTION
  C
                                                                         DTMEX1J9
C
              - ATMOSPHERE TOP ALTITUDE RELATIVE TO MEAN SEA LEVEL
                                                                        DTMEX118
         ZMAX
        7MIN - DEPOSITION PLANE ALTITUDE RELATIVE TO MEAN SEA LEVEL
                                                                         DTMEX111
      ZO
ZP
               - PARCEL CENTER Z COORDINATE AFTER ADVECTION
  C
                                                                         DTMEX112
               - PARCEL CENTER Z COURDINATE BEFORE ADVECTION, ECXEPT AS
  C
                 REDEFINED IN SUB. ADVEC
        7UPP - PARCEL TOP ALTITUDE BEFORE ADVECTION. ZLOW+DWAF
  DTMEX118
         COMMON /CNTROL/ IPOUT, ISIN, ISOUT, JPARN, MC(20), NSEQO
                                                                         DIMEX119
        DIMENSION NUMTAP(15)
                                                                         DTMEX120
```

```
DIMENSION ALT (256), ATP (256), PRS (256), RLH (256), RHC(256), ETA (256)
                                                                              DIMEXI 21
      DIMENSION NET(
                                  1) . NETSU(
                                                                              DIMEX122
                                                 1), WAVG(
                                                                       6)
                          1,
      DIMENSION
                 USUM (
                            35.
                                    1,
                                                VSUM (
                                                                           6) DTMEX123
      DIMENSION DXSUM(
                            35.
                                            6) , DYSUM (
                                                          35 ,
                                                                           6) DTMEX124
                                    1,
                                                         35) . HDAV (
                                                                        6)
      DIMENSION RSUM(
                            35.
                                    1.
                                            6), CAVS(
                                                                              DTMEX125
                                        TIMUP (
      DIMENSION ZBH( 35), ZCH(
                                   35),
                                                   6), MARY(
                                                                              DIMEX126
                                            6) , TSUM(
      DIMENSION
                   WFZ(
                            35,
                                    1,
                                                                              DIMEX127
                                                         35)
              ICF
                             . MARF
                                    , NCF
                                            , NOATF , KBHF , LTIMF
      DATA
                     , JCF
                                                                              DIMEX128
                                 1
                                                  1, 35
                                                                              DTMEX129
                                                                 6 /
                                    •
                                                           .
      NATF=256
                                                                              DIMEX130
                                                                              DIMEX131
      ISIN =NUMTAP( 1)
      ISOUT=NUMTAP( 2)
                                                                              DTMEX132
      IPOUT=NUMTAP( 3)
                                                                              DIMEX133
      JPARN=NUMTAP( 4)
                                                                              DTMEX134
                                                                              DIMEX135
      DO 1 N=1,NCF
                                                                              DIMEX136
    1 NETSU(N)=0
      DO 2 J=1,JCF
                                                                              DIMEX137
      DO 2 I=1, ICF
                                                                              DIMEX138
    2 NET (I.J)=0
                                                                              DIMEX139
      DO 3 M=1, MARF
                                                                              DIMEX140
    3 MARY(M) =0
                                                                              DIMEX141
                                                                              DIMEX142
      DO 4 K=1,KBHF
      CAVS(K) =0.
                                                                              DTMEX143
      TSUM(K) = 0.
                                                                              DIMEX144
      ZBH (K) = 0.
                                                                              DTMEX145
     ZCH(K)=0.
                                                                              DIMEX146
      DO 5 L=1.LTIMF
                                                                              DIMEX147
      HDAV(L)=J.
                                                                              DIMEX148
      TIMUP(L)=0.
                                                                              DTMEX149
      DO 5 K=1,KBHF
                                                                              DIMEX150
    5 WAVG(K.L)=0.0
                                                                              DIMEX151
                                                                              DIMEX152
      DO 6 L=1,LTIMF
      DO 6 N=1.NDATF
                                                                              DIMEX153
      DO 6 K=1.KBHF
                                                                              DIMEX154
      WFZ(K,N,L)=C.
                                                                              DIMEX155
      USUM(K.N.L) =0.
                                                                              DTMEX156
      VSUM(K.N.L) = 0.
                                                                              DIMEX157
                                                                              DIMEX158
      DXSUM(K,N,L)=0.
      DYSUM(K.N.L)=0.
                                                                              DTMEX159
                                                                              DTMEX160
    6 RSUM(K, N,L)=0.
COMMENCE READING DATA INPUTS FROM TAPES ISIN AND JEARN
                                                                              DIMEXI61
                  DTMINT(ALT, ATP, PRS, RLH, RHO, ETA, NATF)
                                                                              DIMEX162
CONTSRUCT AND FILL IN THE ATMOSPHERIC LATTICE AND UPDATE STRUCTURE
                                                                              DTMEX163
COPY IN AND PROCESS WIND AND TURBULENCE DATA
                                                                              DTMEX164
                  DATIN(NET, NETSU, ZBH, ZCH, TIMUP, USUM, VSUM, RSUM, WFZ,
      CALL
                                                                              DTMEX165
     10XSUM.DYSUM.CAVS.MARY.ICF.JCF.NCF.MARF.KBHF.NDATF.LTIMF)
                                                                              DTMEX166
COMPUTE WEIGHTED SUMS OF WIND AND TURBULENCE DATA
                                                                              DTMEX167
      CALL
                  SUMDAT(NET, NETSU, ZBH, ZCH, WAVG, HDAV, USUN, VSUM, RSUM, WFZ,
                                                                              DTMEX168
     1TIMUP, DXSUM, DYSUM, ICF, JCF, NCF, KBHF, NDATF, LTIMF)
                                                                              DTMEX169
CALCULATE THE DIFFUSIVE TRANSPORT OF PARCELS ACCEPTED FROM TAPE JPARN
                                                                              DIMEX170
COPY OUT RESULTS ONTO TAPE IPOUT
                                                                              DIMEX171
                  SPRVS (NET, NETSU, ZBH, ZCH, TIMUP, USUM, VSUM, DXSUM, DYSUM,
                                                                              DTMEX172
     1RSUM.WFZ,CAVS,HDAV,TSUM,WAVG,ALT,ATP,PRS,RLH,RHO,ETA,
                                                                              DIMEX173
     2ICF,JCF,NCF,KBHF,NDATF,LTIMF,NATF)
                                                                              DTMEX174
      RETURN
                                                                              DTMEX175
                                                                              DIMEX176
      END
```

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+ DECK, DTHINT
                                                                          DIMIN
      SUBROUTINE DIMINI (ALT, ATP, PRS, RLH, RHO, ETA, NATF)
                                                                          DIMIN
C
                                                                          DIMIN
C
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                          BIMIN
C
                                                                          DIMIN
                                                                                 5
C
                                                                      WIM TO ***
C
                                                                          DIMIN
C
      DIFFUSIVE TRANSPORT MODULE INITIALIZATION. READS CARD INPUTS.
                                                                          DIMIN
                                                                                 8
      READS BASIC DATA ON THE BINARY TAPE WRITTEN BY SUBROUTINE WNOSFT
C
                                                                          DTMIN
C
      OF THE INITIALIZATION AND CLOUD RISE MODULE.
                                                      FRINTS HEADER AND
                                                                          OTMIN 10
      BASIC DATA AND INITIALIZES THE DTM BINARY OUTPUT TAPE.
                                                                          DIMIN 11
                                                                          DTMIN 12
                                                                         *DTMIN 13
                                                                          DYMIN 14
      COMMON /CNTROL/ IPOUT, ISIN, ISOUT, JPARN, MC(20), NSEQO
                                                                          DIMIN 15
      COMMON /INDEX/ ICX, JCX, KBHX, LTIMX, NAT, NCX, NDATX
                                                                          DIMIN 16
                                                                          DIMIN 17
      COMMON /PARCL/ CROSS,DOWN,DWAF,EDDY,NUATP,PMAS,PSIZ,RHOP,RWAF,
                                                                          DIMIN 18
     1 TP,XP,YP,ZLOW,ZP
      COMMON /SPACE/ WINT, XLLG, YLLC, ZMAX, ZMIN, TIMEX
                                                                          DIMIN 19
                                                                          OS NIMTO
      DIMENSION ALT(NATE),ATP(NATE),PRS(NATE),RLH(NATE),RHC(NATE)
                                                                          OTMIN 21
      DIMENSION ETA(NATF), PS (200), DIAM(200), FMASS(200)
                                                                          DTMIN 22
                                                                          DIMIN 23
      DIMENSION DETID(12), CTMID(12)
                                                                          OTHIN 24
      DATA PROGRM/6HDTMINT/
                                                                          DIMIN 25
                                                                          DIMIN 26
    1 FORMAT(12A6)
                                                                          DTMIN 27
                10X. 54HINITIALIZATION AND CLOUD RISE MODULE IDENTIFICATORMIN 28
     110N - .1246/ 20X, 44FDIFFUSIVE TRANSPORT MODULE IDENTIFICATION - .DTMIN 29
                                                                          DIMIN 30
     2 12A6)
    7 FORMAT(/15X69HTHE CONTROL VARIABLE ARRAY, MC(J), HAS BEEN GIVEN THOTMIN 31
     1E VALUES -)
                                                                          DIMIN
    8 FORMAT(15X, 2014)
                                                                          OTMIN
                                                                                 33
    9 FORMAT(/28X28HTHE TRANSPORT TIME LIMIT IS F12.3. 7H SEC. (F10.5.
                                                                          DIMIN 34
                                                                          DIMIN 35
     1 7H HOURS))
   10 FORMAT( 15X, 39HA FLANE DEPOSITION SURFACE AT ALTITUDE F9.3,
                                                                      30H DIMIN 36
     1 (METERS ABOVE MSL) IS ASSUMED)
                                                                          DIMIN 37
   14 FORMAT(15%, 46HCOORDINATES OF GROUND ZERO (XGZ, YGZ, ZGZ) ARE (E12, 5, DTMIN 30
     1 2H. E12.5.2H. E12.5.10H1 (METERS)/42X16HDETONATION TIME ISE12.5. DTMIN 39
                                                                          DIMIN 40
     2 8H SECONDS/)
   21 FORMAT(2014)
                                                                          DIMIN 41
   23 FORMAT( 1H1,///51X, 19H* * * *
                                              * *//55 x, 11 HO E L F I G//
                                                                          DIMIN 42
                                                    12X, 101HT H E
                                                                   DEPOTMIN 43
     1
                             DEFENSE
                                             FALLOUT
                                                            PREDICEMIN 44
     2A R T M E N T
                       0 F
                S Y S T E M//51X19H+ * * * * * * * * * * * ////48%, 26HOIFFUSIOTMIN 45
     3T I O N
     4VE TRANSPORT MODULE ///
                                           55X, 11HPREPARED 8Y/ 46X, 30HOTMIN 46
     5ATMOSPHERIC SCIENCE ASSOCIATES/ 54X, 14HBEDFORC, MASS.
                                                                          DIMIN 47
     6//// 41X. 40H+++++ SUMMARY OF RUN IDENTIFIERS +++++)
                                                                          DIMIN 48
   27 FORMAT(15X, 76HHORIZENTAL COORDINATES OF THE SOUTH WEST CORNER OF DIMIN 49
     1THE TRANSPORT SPACE ARE (E12.5, 2H, E12.5,1H)/ 35X, 30HTHE RESOLUTOTMIN 50
     210N NET SPACING IS E12.5, 16H (ALL IN MEYERS))
                                                                          DIMIN 51
                                                                          DIMIN 52
   40 FORMAT(8F10.0)
   43 FORMAT(/15X,28HFALLOUT PARTICLE DEMSITY IS E12.5,8H KG/M443.
                                                                          DININ 53
                                                                          DYMIN 54
             THERE AREIS, 22H PARTICLE SIZE GLASSES)
   45 FORMATI/ 15X, 36HPARTICLE PROCESSING BEGINS WITH THE I6, 12H TH PADTMIN 55
                                                                          DIMIN 55
     1RTICLE)
   46 FORMAT(1H1)
                                                                          OTMIN 57
   47 FORMAT(/ 15X. 28HTRANSFORT IS BY THE )
                                                                          DIMIN 58
                                                                          DTMIN 59
   48 FORMAT(1H+ 34X, 12HQUICK METHOD)
   49 FORMAT(1H+, 34X, 21 HLAYER-BY-LAYER METHOD)
                                                                           DIMIN 68
```

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50 FORMAT(28X, 57HRATIC OF LAGRANGIAN TO EULERIAN TURBULENCE TIME SCALDTMIN 61
     1ES ISF8.3)
                                                                              DTHIN 62
C
                                                                              DYMIN 63
COPY IN IDENTIFICATION FOR DIFFUSIVE TRANSPORT
                                                                               DTMIM 64
      READ (ISIN.1) DTHID
                                                                               DIMIN 65
COPY IN OPTION CONTROL CODE DATA FOR DIFFUSIVE TRANSPORT
                                                                               DTMIN 66
      READ (ISIN, 21) MC
                                                                               DTMIN 67
      READ(ISIN, 21) ICX, JCX, NSEQO
                                                                               DIMIN 68
      IF(ICX .EQ. L) ICX=1
                                                                               DIMIN 69
      IF(JCX .EQ. () JCX=1
                                                                               DIMIN 70
      IF (NSEQO . EQ. 0) NSEQO=1
                                                                               DTMIN 71
      READ(ISIN, 40) WINT, XLLC, YLLC, TIMEH, EDDY
                                                                               DTMIN 72
      IF(EDDY .EQ. 0.0) ECDY=4.0
                                                                               DTMIN 73
COMPOSE ALL TAPES NEEDED FOR DIFFUSIVE TRANSPORT
                                                                               DIMIN 74
      REWIND JPARN
                                                                               DIMIN 75
      REWIND IPOUT
                                                                               DTMIN 76
COPY IN BASIC HEADER DATA FROM ICRM OUTPUT TAPE
                                                                               DTMIN 77
      READ (JPARN) FW, SSAM, SLOTMP, TMSD, SD, W, HEIGHT, KH OF, RADMAX, ZMIN
                                                                               DTMIN 78
      READ (JPARN) XGZ, YGZ, TGZ
                                                                               DIMIN 79
                                                                               DIMIN 80
      READ (JPARN)(DETID(I),I=1,12)
      READ (JPARN) NDSTR
                                                                               DIMIN 81
                                                                               DTMIN 82
      READ (JPARN) (PS(J), CIAM(J), FMASS(J), J=1, NOSTR)
      READ (JPARN)NAT
                                                                               DTMIN 83
      READ (JPARN) (ALT(J), ATP(J), PRS(J), RLH(J), RHO(J), ETA(J), J=1, NAT)
                                                                               DIMIN 84
COPY OUT HEADER DATA ON TO THE DTM BINARY OUTPUT TAPE
                                                                               DTMIN 85
      WRITE(IPOUT)FH,SSAH,SLOTMP,TMSD,SD,W,HEIGHT,RHOP,RADMAX,ZMIN
                                                                               [ 'MIN 86
      WRITE (I POUT) XGZ, YGZ, TGZ
                                                                               U. MIN 87
                                                                               DIMIN 88
       WRITE (IPOUT) (DETID(J), J=1,12)
       WRITE (IPOUT) (DIMIC(J).J=1.12)
                                                                               DIMIN 89
                                                                               DE NIMIG
      WRITE (IPOUT) NOSTR
       WRITE (IPOUT) (PS(J), DIAM(J), FMASS(J), J=1, NOSTR)
                                                                               DIMIN 91
COPY OUT DIFFUSIVE TRANSPORT HEADING
                                                                               DIMIN 92
                                                                               DTMIN 93
       WRITE (ISOUT, 23)
       WRITE (ISOUT,2) (DETID(J),J=1,12),(DTMID(J),J=1,12)
                                                                               DIMIN 94
       WRITE (ISOUT,7)
                                                                               DIMIN 95
       WRITE (ISOUT, 8) MC
                                                                               DTHIN 96
                                                                               DTMIN 97
      TIMEX=TIMEH+3600.
       WRITE (ISOUT,9) TIMEX, TIMEH
                                                                               DIMIN 38
       IF(MC(6) .GT. 0) WRITE(ISOUT,50) EDDY
                                                                               DIMIN 99
      WRITE (ISOUT,14) XGZ, Y (Z, ZMIN, TGZ
                                                                               DIMIN1UU
       WRITE (ISOUT, 27) XLLC, YLLC, WINT
                                                                               DIMIN181
       WRITE (ISOUT, 10) ZMIN
                                                                               OTMIN102
       WRITE (ISOUT, 43) RHOP, NOSTR
                                                                               DTMIN133
       WRITE(ISOUT, 47)
                                                                               DIMIN184
       IF(HC(4) .EQ. 0) WRITE(ISOUT,48)
                                                                               DIMIN135
       IF (MC(4) .NE. G) WRITE(ISOUT, 49)
                                                                               DTMIN106
       IF(NSEQO .NE. 1) WRITE(ISOUT,45) NSEQO
IF(MC(2) .NE. 1) WRITE(ISOUT,46)
                                                                               DIMIN107
                                                                               DIMIN108
                                                                               DTMIN139
       RETURN
       END
                                                                               DIMIN110
```

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```
DUMPE
*DECK, DUMPER
      SUBROUTINE DUMPER (XC.YO, ZO, TO, SIGXO, SIGYO, PMAS, PSIZ, RO, INCOMP,
                                                                            DUMPE
     1ISOUT.IPOUT.MC3)
                                                                            DUMPE
                                                                            DUMPE
      H. G. NORMENT. ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                            DUMPE
                                                                            DUMPE
                                                                            DUMPE
                                                                             DUMPE
                                                                            DUMPE
C
      SUBROUTINE CUMPER WRITES THE NBLK RECORDS -
C
              XO, YO, ZO, TO, SIGXO, SIGYO, RO, PSIZ, FMAS
                                                                             BUMPE
                                                                                   10
      ONTO TAPE IPOUT. AND IF MC(3) IS NOT ZERO, ONTO TAPE ISOUT.
                                                                            DUMPE
                                                                            DUMPE
                                                                            *DUMPE 13
C
                                                                             DUMPE 14
C
      OIMENSION XOUT(100), YOUT(100), ZOUT(100), TOUT(100), ROUT(100)
                                                                             DUMPE 15
                                                                             DUMPE 16
      DIMENSION SYOT(100), SXOT(100), PSOT(100), PDEP(100)
      DATA N/O/, NBLK/100/
                                                                             CUMPE 17
                                                                             DUMPE
  897 FORMAT(5X,9E12.4)
                          8HBLOCK OFI5, 52H TRANSPORTED PARCEL PROPERTIESOUMPE 19
  617 FORMAT( 1H0, 23X,
     1 WRITTEN ON IPOUT TAFE/ 12X, 2HXC, 10X, 2HYO, 10X, 2HZO, 1JX,
                                                                             BUMPE 20
     2 CHTO, 8X, 5HSIGXO, 7X, 5HSIGYO, 9X, 2HRO, 9X, 4HPSIZ, 8X,4HPMAS/) DUMPE 21
 8023 FORMAT( 1HD, 14X, 59FRESUME PRE-TRANSPORT PARCEL PROPERTY LIST FORDUMPE 22
                                                                             DUMPE 23
     1 PARTICLE SIZEE12.5, 7H METERS)
 AND 4 FORMAT( 2X, 4HNSEQ, 6X, 2HXP, 10X, 2HYP, 1UX, 2HZP, 10X, 2HTP,
                                                                             DUMPE 24
                                                                             DUMPE 25
     1 9X, 4HPMAS, 8X, 4HRWAF, 7X, 4HZLON, 8X, 4HDWAF/)
                                                                             DUMPE 26
      IF(INCOMP.GT.0) GO TC 8063
                                                                             DUMPE 27
      N \approx N + 1
                                                                             DUMPE 28
      XOUT(N) = XO
                                                                             DUMPE 29
      YOUT(N)=YO
                                                                             DUMPE 30
      70UT(N) =70
                                                                             DUMPE 31
      TOUT(N) = TO
                                                                             DUMPE
                                                                                   32
      SXOT(N) =SIGXO
                                                                             DUMPE
                                                                                   33
      SYOT (N) =SIGYO
                                                                             CUMPE 34
      PSOT(N) =PSIZ
                                                                             JUMPE 35
      PDEP(N)=PMAS
                                                                             DUMPE 36
      ROUT (N) =RO
                                                                             DUMPE 37
      IF(N.LT.NBLK) RETURN
COPY OUT BUFFER DATA VECTORS ONTO TAPE IPOUT IF THEY ARE FULL
                                                                             DUMPE 38
 8C63 WRITE (IPOUT) N
                                                                             DUMPE 39
                                                                             DUMPE 40
      IF( MC3 .GT. 1) WRITE(ISOUT.817) N
                                                                             DUMPE 41
      IF (N.EQ.O) RETURN
                         (XCLT(M), YOUT(M), ZOUT(M), TOUT(M), SXOT(M), SYOT(M), DUMPE 42
      WRITE (I POUT)
                                                                             DUMPE 43
     1ROUT(M), PSOT(M), PDEP(M), N=1,N)
      IF(MC3 .LE. 1) GO TG 8064
      WRITE(ISOUT,807) (XOUT(M), YOUT(M), ZOUT(M), TOUT(M), SXOT(M), SYOT(M), DUMPE 45
                                                                             DUMPE 46
     1ROUT(M), PSOT(M), PDEP(M), M=1,N)
                                                                             DUMPE 47
      WRITE (ISOUT, 8023) PSIZ
                                                                             DUMPE 48
      WRITE(ISOUT,8624)
                                                                             DUMPE 49
 3064 N=0
                                                                             DUMPE 50
      RETURN
                                                                             DUMPE 51
      END
```

```
GETDA
*DECK, GETDA
      SUBROUTINE GETDA (ASUM, ZBH, KBHA, KBHB, ND ATA, LTIM, ABAR, KBHF, NDATF, GETDA
                                                                            GETDA
                                                                                   3
     1LTIMF)
C
      MARCH, 1971
                                                                            GETDA
      SUBROUTINE GETDA COMPUTES THE AVERAGED QUANTITY ABAR, WHICH MAY BEGETDA
                                                                                    5
                                                                            GETDA
      A MEASURE OF HORIZONTAL ADVECTION, ROTATION OR DISPERSION, FROM
C
      DATA STORED IN THE APPROPRIATE ARRAY ASUM.
                                                                            GETOA
C
            - 3-DIM. DATA ARRAY PREPARED IN SUBROUTINE SUMDAT.
                                                                            GETDA
C
              USUM, VSUM, DXSUM, DYSUM, OR RSUM.
                                                                            GETDA
                                                                                   9
C
            - WTD. AVG. OVER AFRAY ASUM FROM INDICES KBHA-1 TO KBHB-1
                                                                            GETDA 10
      ABAR
            - INDEX OF UPPER STRATUM BASE-ALTITUDE Z8H
C
      KBHA
                                                                            GETDA 11
C
              INDEX OF LOWER STRATUM BASE-ALTITUDE ZBH
                                                                            GETDA 12
      KBHB
                                                                            GETDA 13
      NDATA - HORIZ. SPACE INDEX OF ARRAY ASUM
      LTIM - UPDATE TIME INDEX OF ARRAY ASUM
                                                                            GETDA 14
      COMMON /INDEX/ ICX, JCX, KBHX, LTIMX, NAT, NCX, NDATX
                                                                            GETDA 15
      COMMON /CNTROL/ IPOUT, ISIN, ISOUT, JPARN, MC(20), NSEQU
                                                                            GETDA 16
      DIMENSION ASUM(KBHF, NOATF, LTIMF), ZBH (KBHF)
                                                                            GETDA 17
                                                                            GETUA 18
      DATA PROGRM/6HGETDA /
CHECK IF KBHA-1 EXCEEDS KBHX
                                                                            GETDA 19
                                                                            GETOA 20
      IF(KBH4-KBHX-1) 3,2,1
                                                                            GETDA 21
    1 I=1
                                                                            GETDA 22
   10 CALL ERROR(PROGRM, I, ISOUT)
                                                                            GETDA 23
      ABAR=0.
                                                                            GETDA 24
      RETURN
                                                                            GETDA 25
    2 ABAR=ASUM(KBHA-1, NCATA, LTIM)
                                                                            GETDA 26
      RETURN
    3 ABAR=ASUM(K8HA-1, NDATA, LTIM)
                                                                            GETDA 27
                                                                            GETDA 28
CHECK IF KBHB IS LESS THAN 1
      IF(KBHB-1) 6,5,4
                                                                            GETDA 29
                                                                            GETDA 30
    6 I=6
      GO TO 10
                                                                            GETDA 31
                                                                            GETDA 32
CONCLUDE ABAR COMPUTATION
    4 ABAR=ABAR=ASUM(KBHB-1,NDATA,LTIM)
                                                                            GETDA 33
                                                                            GETDA 34
    5 ABAR=ABAR/(ZBH(KBHA)-ZBH(KBHB))
      RETURN
                                                                            GETOA 35
      END
                                                                            GETDA 36
```

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```
*DECK, GETUP
                                                                         GETUP
      SUBROUTINE GETUP (NET, NETSU, MARY, MARF, ICF, JCF, NCF, NDATF)
                                                                         GETUP
                                                                         GETUP
C
      MARCH. 1971
                                                                         GETUP
                                                                         GETUP
                                                                         GETUP
C
      SUBROUTINE GETUP PREPAGES THE HORIZONTAL SPACE CONTROL NET
                                                                         GETUP
C
      ARRAYS NET( IC, IC ) AND NETSU ( NC ) FROM DATA PROVIDED BY THEGETUP
      USER IN THE GRID SPECIFICATION ARRAY MARY( MARK ).
                                                                         GETUP
                                                                         GETUP 10
      THE SUBSCRIPTS IC AND JC OF THE TWO-CIMENSICNAL ARRAY
                                                                         GETUP
      NET ( IC. JC ) LOCATE ( SYMBOLICALLY ) THE CENTERS OF CONTIGLOUS
C
                                                                         GETUP
C
      UNIT MESH SQUARES ( OF DIMENSION WINT ) RELATIVE TO THE UNIT
                                                                         GETUP 13
      SQUARE IN THE SOUTH-WEST CORNER OF THE NET. FOR THIS SOUTH-WEST GETUP
C
      CORNER UNIT MESH
                        IC = JC = 1. IC IS INCREMENTED IN THE
                                                                         GETUP 15
      EASTERLY DIRECTION AND
                             JC IS INCREMENTED IN THE NURTHERLY
                                                                         GETUP 16
      DIRECTION.
                                                                         GETUP 17
                                                                         GETUP 18
      ON FIRST PASS THROUGH THE ELEMENTS OF MARY( MARK ) EACH POSITIVEGETUP 19
C
      INTEGER FLAGS A PARTICULAR NON-SUBDIVIDED UNIT MESH SQUARE. A 0
                                                                         GETUP 20
      FLAGS A PARTICULAR SUBDIVIDED UNIT MEUH SQUARE.
                                                                         GETUP 21
      A UNIQUE VALUE OF NDATA ( THE ARRAY INDEX WHICH REFERENCES ALL OF GETUP 22
                                                                         GETUP 23
      THE ATMOSPHERIC DATA ARRAY ELEMENTS ASSOCIATED WITH THIS UNIT
                                                                         GETUP 24
      SQUARE ) IS STORED IN NET( IC, JC ).
                                                                         GETUP 25
C
                                                                         GETUP 26
C
      WHEN ZERO IS FOUND IN AN ELEMENT OF MARY ( MARK ) .
C
      NC ( THE ARRAY INDEX WHICH REFERENCES A STARTING LOCATION IN THE GETUP 27
      ARRAY
            NETSU ( NC ) ) IS STORED IN NET( IC, JC ) AS A NEGATIVE GETUP 28
      INTEGER -NC.
                                                                         GETUP 29
                                                                         GETUP 30
                                             ON SECOND PASS THROUGH
C
      MARY( MARK ) IS ERASED AND RELOADED.
                                                                         GETUP 31
C
      THE ELEMENTS OF MARY( MARK ), THE ELEMENT NO OF THE ARRAY
                                                                         GETUP 32
                                                                         GETUP 33
C
      NETSU ( NO ) WILL BE LOADED WITH CONTROL DATA PERTAINING TO THE
C
      LOWER-LEFT QUADRANT OF THE SUBDIVIDED MESH SQUARE. THE SUCCEEDINGGETUP 34
      THREE ELEMENTS ( NETSU ( NC+1 ), NETSU ( NC+2 ), NETSU ( NC+3 ) ) GETUP
      WILL BE LOADED WITH CONTROL DATA PERTAINING TO THE OTHER THREE
                                                                         GETUP 36
                                                                         GETUP 37
C
      QUADRANTS, PROCEEDING CLOCKWISE FROM THE FIRST QUADRANT.
                                                                THESE
                                                     VALUES FLAGGED BY GETUP 38
      CONTROL DATA WILL BE ADDITIONAL NOATA OR NO
      MARY( MARK ).
                                                                         GETUP 39
                                                                         GETUP 40
      PROCESSING CONTINUES UNTIL NO ADDITIONAL ELEMENTS NO
                                                              ARE FLAGGEDGETUP 41
         MARY( MARK ).
                                                                         GETUP 42
C
                                                                         GETUP 43
                                                                         GETUP 44
      COMMON /CNTROL/ IPOUT, ISIN, ISOUT, JPARN, MC(20), NSEQO
      COMMON /INDEX/ ICX, JCX, KBHX, LTIMX, NAT, NCX, NDATX
                                                                         GETUP 45
                                                                   MARF) GETUP 46
      DIMENSION
                      NET(ICF, JCF),
                                        NETSU (
                                                NCF),
                                                             MARY (
      DATA PROGRM/6HGETUP /
                                                                         GETUP 47
                                                                         GETUP 48
                                                                         GETUP 49
 1000 FORMAT( 3612 )
 1001 FORMAT( 1HO, 25X, 31HARRAY MARY HAS BEEN LOACED WITH, 15, 22H ELEMEGETUP 50
     1NT(S) AS FOLLOWS/)
                                                                         GETUP 51
 1002 FORMAT(25X,3612)
                                                                         GETUP 52
                                                                         GETUP 53
      MSECT = 4
                                                                         GETUP 54
      MNEG = 1 - MSECT
                                                                         GETUP 55
      NDATA = 0
                                                                         GETUP 56
                                                                         GETUP 57
      IC = 0
                                                                         GETUP 58
      JC = 1
                                                                         GETUP 59
      IF(ICX.GT.ICF) CALL ERROR (PROGRM,-1, ISOUT)
      IF(JCX.GT.JCF) CALL ERROR(PROGRM,-1,1SOUT)
                                                                         GETUP 60
```

```
MARX = ICX + JCX
                                                                           GETUP 61
     DD Z MARK = 1, MARF
                                                                           GEYUP 62
2
     MARY(MARK) = -9
                                                                           GETUP 63
     IF (MARX.GT.MARF) CALL ERROF (PROGRM,-2, ISCUT)
                                                                           GETUP 64
     READ(ISIN, 1000) (MARY(MARK), MARK=1, MARX)
                                                                           GETUP 65
     WRITE (ISOUT, 1001) MARX
                                                                           GETUP 66
     WRITE (ISOUT, 1002) (MARY (MARK), MARK=1, MARX)
                                                                           GETUP 67
     MARK = 0
                                                                           GETUP 68
     MCTR = 0
                                                                           GETUP 69
     MARK = MARK + 1
                                                                           GETUP 70
     IF( MARK - MARX ) 5, 5, 4
                                                                           GETUP 71
     MARX = MSECT * MCTR
                                                                           GETUP 72
     IF( MARX ) 6, 14, 1
                                                                           GETUP 73
     IF( MARY( MARK ) ) 6, 7, 8
5
                                                                           GETUP 74
     CALL ERROR (PROGRM, -6, ISOUT)
                                                                           GETUP 75
6
     MNEG = MNEG + MSECT
                                                                           GETUP 76
     NQQ = - MNEG
                                                                           GETUP 77
     MCTR = MCTR + 1
                                                                           GETUP 78
     G0 T0 9
                                                                           GETUP 79
8
     NDATA = NDATA + 1
                                                                           GETUP 80
     NQQ = NDATA
                                                                           GETUP 81
     NDATX = NDATA
                                                                           GETUP 82
     IF(NDATX.GT.NDATF) CALL ERROR(PROGRM, -8, ISOUT)
                                                                           GETUP 83
9
     IC = IC + 1
                                                                           GETUP 84
     IF( JC - JCX ) 10, 10, 13
                                                                           GETUP 85
10
     IF( IC - IGX ) 12, 12, 11
                                                                           GETUP 86
     JC = JC + 1
11
                                                                           GETUP 87
     IC = D
                                                                           GETUP 88
     GO TO 9
                                                                           GETUP 89
12
     NET(IC, JC) = NQQ
                                                                           GETUP 90
     GO TO 3
                                                                           GETUP 91
13
     NC = IC
                                                                           GETUP 92
     NETSU( NC ) = NQQ
                                                                           GETUP 93
     NCX = NC
                                                                           GETUP 94
     IT (NCX. GT. NCF) CALL ERROR (PROGRM, -13, ISOUT)
                                                                           GETUP 95
     GO TO 3
                                                                           GETUP 96
14
     RETURN
                                                                           GETUP 97
                                                                           GETUP 98
     END
```

```
*GEC K, LAYERS
                                                                         LAYER
     SUBROUTINE LAYERS (ZCF, ZBH, KBHF)
                                                                          LAYER
                                                                         LAYER
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
C
                                                                          LAYER
                                                                          LAYER
                                                                         *LAYER
                                                                         LAYER
                                                                                 7
      CONSTRUCTS THE ATMOSPHERE STRATIFICATION ARRAYS ZBH AND ZGH FOR
                                                                          LAYER
      THREE-DIMENSIONAL WIND AND TURBULENCE FIELDS.
                                                                          LAYER
      ZBH CONTAINS STRATA BASE ALTITUDES AND ZCH CONTAINS STRATA CENTER LAYER 10
      ALTITUDES (BCTH RELATIVE TO MEAN SEA LEVEL) (METERS)
                                                                          LAYER 11
                                                                          LAYER 12
 **********
                                                                       ***LAYER 13
C
                                                                          LAYER 14
C
      COMMON /CNTROL/ IPOUT, ISIN, ISOUT, JPARN, MC(20), NSEQO
                                                                          LAYER 15
      COMMON /INDEX/ ICX, JCX, KBHX, LTIMX, NAT, NCX, NDATX
                                                                          LAYER 16
      COMMON /SPACE/ WINT, XLLC, YLLC, ZMAX, ZMIN, TIMEX
                                                                          LAYER 17
                                                                          LAYER 18
      INTEGER BASALT, CNTALT, TLAYR
                                                                          LAYER 19
      DIMENSION ZBH(KBHF), ZCH(KBHF), ENTRY(8)
                                                                          LAYER 20
                                                   ,ALIMIT
                                                                          LAYER 21
      DATA PROGRM
                    , BASALT
                              •CNTALT •EPSZ
                                                             , IREC
          /6HLAYERS ,4HBASE
                               . 4HCENT
                                         . 0.1
                                                   , 999999. , 8
                                                                        / LAYER 22
                                                                          LAYER 23
    1 FORMAT( 10X, 6HLEVELS, 14, 5H THRU, 14/25X, 8F12.5)
                                                                          LAYER 24
                                                                          LAYER 25
    2 FORMAT(8F1C.C)
    3 FORMAT(1H9, 48X, 25HWIND LAYER BASE ALTITUDES/)
                                                                          LAYER 26
    4 FORMAT(1HB: 43X, 27HWIND LAYER CENTER ALTITUDES/)
                                                                          LAYER 27
                                                                          LAYER 28
    5 FORMAT( 11XA4)
     FORMAT(1HB,25X,31HMA) IMUM WIND SPACE ALTITUDE IS E12.5,7H METERS) LAYER 29
    FORMAT(1H0,10X, 45HZ8H(1)AND ZMIN OO NUT AGREE WITHIN TOLERANGE ,ELAYER 30
                                                                          LAYER 31
     112,5)
                                                                          LAYER 32
COPY IN DATA TYPE (LAYER BASE OR CENTER ALTITUCE) INDICATOR
                                                                          LAYER 33
      READ(ISIN, 5) TLAYR
                                                                          LAYER 34
                                                                          LAYER 35
COPY WIND LAYER ALTITUDES INTO ARRAY ZOH
                                                                          LAYER 36
      K = 0
                                                                          LAYER 37
  20C READ(ISIN, 2) (ENTRY(I), I=1, IREC)
                                                                          LAYER 38
      06 231 I=1, IREC
      IF(ENTRY(I),GE.ALIKIT) GO TO 202
                                                                          LAYER 39
                                                                          LAYER 40
      IF(ENTRY(I) .LT. 6.0) GO TO 201
      K=K+1
                                                                          LAYER 41
      IF (K.GT.KBHF) CALL ERROR (PROGRM, -201, ISOUT)
                                                                          LAYER 42
                                                                          LAYER 43
      ZCH(K)=ENTRY(I)
                                                                          LAYER 44
  201 CONTINUE
      GO TO 200
                                                                          LAYER 45
  202 K3HX=K
                                                                          LAYER 46
COMMINGLE THE LAYER ALTITUDES INTO ASCENDING ORDER
                                                                          LAYER 47
                                                                          LAYER 48
      KBHM1=KBHX=1
      DO 216 I=1, KBHM1
                                                                          LAYER 49
                                                                          LAYER 50
      IP1=I+1
                                                                          LAYER 51
      00 210 J=IP1,KBHX
      IF(ZCh(I).LE.ZCH(J))G0 TO 210
                                                                          LAYER 52
      TEMP=ZCH(I)
                                                                          LAYER 53
      ZCH(I) = ZCH(J)
                                                                          LAYER 54
      7CH(J)=TEMP
                                                                          LAYER 55
                                                                          LAYER 56
 210 CONTINUE
COMPUTE LAYER CENTER OR BASE ALTITUDES DEPENDING ON WHICH WERE INPUT
                                                                          LAYER 57
                                                                          LAYER 58
      IF (TLAYR.EQ.CNTALT) GC TO 250
                                                                          LAYER 59
      IF (TLAYRINE BASALT) CALL ERROR (PROGRM , - 23 J, ISCUT)
      IF (ABS(ZCH(1)-ZMIN) .LE.EPSZ) GU TO 235
                                                                          LAYER 60
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234 CALL ERROR(PROGRM, -234, ISOUT) 235 ZCH(1) = ZMIN CONSTRUCT MIND LAYER CENTER ALTITUDES IN ARRAY ZCH AND LOAD BASE C ALTITUDES INTO ZBH CO 240 K=1, KBHM1 ZBH(K) = ZCH(K) ZBH(K) = ZCH(K) + ZCH(K+1))/2.0 ZCH(KBHX) = ZCH(KBHX) ZCH(KBHX) = ZCH(KBHX) CO 10 300 CONSTRUCT MIND LAYER BASE ALTITUDES IN ARRAY ZBH LAYER 70 CONSTRUCT MIND LAYER BASE ALTITUDES IN ARRAY ZBH LAYER 71 CONSTRUCT MIND LAYER BASE ALTITUDES IN ARRAY ZBH LAYER 72 250 ZBH(1) = ZHN DO 260 I = 2, KBHX 260 ZBH(I) = 2.0 + ZCH(KBHX) - ZBH(I-1) 300 ZAM = 2.0 + ZCH(KBHX) - ZBH(I-1) TO 250 ZBH(I) = 2.0 + ZCH(KBHX) - ZBH(KBHX) COPY OUT MIND LAYER DATA WRITE (ISOUT, 6) ZMAX WRITE (ISOUT, 6) ZMAX LAYER 76 WRITE (ISOUT, 6) ZMAX LAYER 76 ISTOP=IGO+IREC-1 IF (ISTOP.GT - KBHX), IREC LAYER 81 LAYER 82 MRITE (ISOUT, 1) IGC, ISTOP, (ZBH(K), K=IGO, ISTOP) WRITE (ISOUT, 1) IGC, ISTOP, (ZBH(K), K=IGO, ISTOP) LAYER 83 WRITE (ISOUT, 1) IGC, ISTOP, (ZBH(K), K=IGO, ISTOP) LAYER 86 ISTOP=IGO+IREC-1 IF (ISTOP.GT - KBHX) ISTOP=KBHX 303 WRITE (ISOUT, 1) IGC, ISTOP, (ZCH(K), K=IGO, ISTOP) END END	WRITE(ISOUT,8) EPSZ	LAYER 61
CONSTRUCT WIND LAYER CENTER ALTITUDES IN ARRAY ZCH AND LOAD BASE C ALTITUDES INTO ZBH DO 240 K=1,KBHM1 LAYER 65 DO 240 K=1,KBHM1 LAYER 66 78H(K)=ZCH(K) 240 ZCH(K)= (ZCH(K) + ZCH(K+1))/2.0 ZCH(KBHX)= ZCH(KBHX) ZCH(KBHX)= Z.0*ZBH(KBHX) - ZCH(KBHX-1) GO TO 300 CONSTRUCT WIND LAYER BASE ALTITUDES IN ARRAY ZBH LAYER 70 CONSTRUCT WIND LAYER BASE ALTITUDES IN ARRAY ZBH LAYER 72 250 ZBH(1)=ZMIN DO 260 I=2,KBHX LAYER 74 260 ZBH(I)=2.0*ZCH(KBHX)-ZBH(I-1) 300 ZMAX=2.0*ZCH(KBHX)-ZBH(KBHX) LAYER 75 301 ZMAX=2.0*ZCH(KBHX)-ZBH(KBHX) LAYER 76 WRITE (ISOUT,6)ZMAX HRITE(ISOUT,6)ZMAX HRITE(ISOUT,6)ZMAX LAYER 76 LAYER 78 WRITE(ISOUT,6)ZMAX LAYER 79 DO 301 IGO=1,KBHX,IREC LAYER 81 IF(ISTOP.GT.KBHX) ISTOP=KBHX 301 WRITE(ISOUT,1) IGC,ISTOP, (ZBH(K),K=IGO,ISTOP) LAYER 82 ISTOP=IGO*IREC-1 IF(ISTOP-GT.KBHX) ISTOP=KBHX AVER 85 ISTOP=IGO*IREC-1 IF(ISTOP-GT.KBHX) ISTOP=KBHX AVER 86 RETURN LAYER 87		
C ALTITUDES INTO ZBH		
CO 240 K=1,KBHM1		
ZBH(K) = ZCH(K)	· · · · · · · · · · · · · · · · · · ·	
240 7CH(K) = (2CH(K) + 7CF(K+1))/2.0	00 240 K=1,KBHM1	LAYER 66
ZBH(KBHX)=ZCH(KBHX)	ZBH(K)=ZCH(K)	LAYER 67
ZCH(KBHX) = 2.0*ZBH(KBHX) - ZCH(KBHX-1)	240 ZCH(K)= {ZCH(K) + ZCH(K+1))/2.0	LAYER 68
GO TO 300 CONSTRUCT WIND LAYER BASE ALTITUDES IN ARRAY ZBH 250 ZBH(1)=ZMIN	Z9H(KBNX)=ZCH(KBHX)	LAYER 69
CONSTRUCT WIND LAYER BASE ALTITUDES IN ARRAY 28H 250 Z8H(1)=ZMIN	ZCH(KBHX)= 2.0*ZBH(KBHX) - ZCH(KBHX-1)	LAYER 70
ZBH (1) = ZMIN	GO 10 300	LAYER 71
DO 260 I=2,KBHX 260 ZBH(I)=2.0*ZCH(I-1) - ZBH(I-1) 370 ZMAX=2.0*ZCH(KBHX)-ZBH(KBHX) COPY OUT WIND LAYER DATA WRITE (ISOUT,6)ZMAX WRITE(ISOUT,3) DO 301 IGO=1,KBHX,IREC IF(ISTOP-IGO+IREC-1 IF(ISTOP-KBHX) IS IOP=KBHX 301 WRITE(ISOUT,4) DO 373 IGC=1,KBHX,IREC ISTOP=IGO+IREC-1 LAYER 84 DO 373 IGC=1,KBHX,IREC LAYER 85 ISTOP=IGO+IREC-1 LAYER 86 IF(ISTOP-GT.KBHX) ISTOP=KBHX AYER 86 IF(ISTOP-GT.KBHX) ISTOP=KBHX LAYER 87 303 WRITE(ISOUT,1)IGG,ISTOP, (ZCH(K),K=IGO,ISTOP) RETURN LAYER 88	CONSTRUCT WIND LAYER BASE ALTITUDES IN ARRAY ZBH	LAYER 72
260 ZBH(I)=2.0*ZCH(T-1) - ZBH(I-1) 370 ZMAX=2.0*ZCH(KBHX)-ZBH(KBHX) COPY OUT WIND LAYER DATA WRITE (ISOUT,6)ZMAX WRITE(ISOUT,3) 00 301 IGO=1,KBHX,IREC ISTOP=IGO+IREC-1 IF(ISTOP.GT.KBHX) ISTOP=KBHX 301 WRITE(ISOUT,1)IGC,ISTOP,(ZBH(K),K=IGO,ISTOP) WRITE(ISOUT,4) DO 373 IGO=1,KBHX,IREC ISTOP=IGO*IREC-1 LAYER 84 DO 373 IGO=1,KBHX,IREC LAYER 85 ISTOP=IGO*IREC-1 IF(ISTOP.GT.KBHX) ISTOP=KBHX 303 WRITE(ISOUT,1)IGC,ISTOP,(ZCH(K),K=IGO,ISTOP) RETURN LAYER 89	250 ZBH(1)=ZMIN	LAYER 73
306 ZMAX=2.0*ZCH(KBHX)-ZBH(KBHX) COPY OUT WIND LAYER DATA WRITE (ISOUT,6)ZMAX WRITE(ISOUT,3) DO 301 IGO=1,KBHX,IREC ISTOP=IGO+IREC-1 IF(ISTOP.GT.KBHX) IS TOP=KBHX 301 WRITE(ISOUT,1) IGC,ISTOP,(ZBH(K),K=IGO,ISTOP) WRITE(ISOUT,4) DO 313 IGO=1,KBHX,IREC ISTOP=IGO*IREC-1 IF(ISTOP.GT.KBHX) ISTOP=KBHX AYER 84 DO 313 IGO=1,KBHX,IREC LAYER 85 ISTOP=IGO*IREC-1 IF(ISTOP.GT.KBHX) ISTOP=KBHX 303 WRITE(ISOUT,1)IGC,ISTOP,(ZCH(K),K=IGO,ISTOP) RETURN LAYER 89	DO 260 I=2,KBHX	LAYER 74
COPY OUT WIND LAYER DATA WRITE (ISOUT,6)ZMAX WRITE(ISOUT,3) DO 301 IGO=1,KBHX,IREC ISTOP=IGO+IREC-1 IF(ISTOP.GT.KBHX) ISTOP=KBHX 301 WRITE(ISOUT,1)IGC,ISTOP, (ZBH(K),K=IGO,ISTOP) WRITE(ISOUT,4) DO 373 IGO=1,KBHX,IREC ISTOP=IGO&IREC-1 IF(ISTOP.GT.KBHX) ISTOP=KBHX 303 WRITE(ISOUT,1)IGC,ISTOP, (ZCH(K),K=IGO,ISTOP) RETURN LAYER 89	260 ZBH(I)=2.0*ZCH(I-1) - ZBH(I-1)	LAYER 75
WRITE (ISOUT,6)ZMAX WRITE(ISOUT,3) DO 301 IGO=1,KBHX,IREC ISTOP=IGO+IREC-1 IF(ISTOP.GT.KBHX) IS 10P=KBHX 301 WRITE(ISOUT,1)IGC,ISTOP, (ZBH(K),K=IGO,ISTOP) WRITE(ISOUT,4) DO 313 IGO=1,KBHX,IREC ISTOP=IGO*IREC-1 IF(ISTOP.GT.KBHX) ISTOP=KBHX 303 WRITE(ISOUT,1)IGC,ISTOP, (ZCH(K),K=IGO,ISTOP) RETURN LAYER 89	396 ZMAX=2.0*ZCH(KBHX)-ZBH(KBHX)	LAYER 76
WRITE(ISOUT,3) 00 301 IGO=1,KBHX,IREC	COPY OUT WIND LAYER DATA	LAYER 77
00 301 IGO=1,KBHX,IREC	WRITE (ISOUT,6)ZMAX	LAYER 78
ISTOP=IGO+IREC-1 IF(ISTOP.GT.KBHX) IS TOP=KBHX 301 WRITE(ISOUT.1) IGC, ISTOP, (ZBH(K), K=IGO, ISTOP) WRITE(ISOUT.4) DO 313 IGO=1, KBHX, IREC ISTOP=IGO*IREC-1 IF(ISTOP.GT.KBHX) ISTOP=KBHX 303 WRITE(ISOUT.1) IGC, ISTOP, (ZCH(K), K=IGO, ISTOP) RETURN LAYER 89	WRITE(ISOUT.3)	LAYER 79
IF (ISTOP.GT.KBHX) IS TOP=KBHX 301 WRITE (ISOUT.1) IGC, ISTOP, (ZBH(K), K=IGO, ISTOP) WRITE (ISOUT.4) DO 313 IGO=1, KBHX, IREC ISTOP=IGO*IREC-1 IF (ISTOP.GT.KBHX) ISTOP=KBHX 303 WRITE (ISOUT.1) IGC, ISTOP, (ZCH(K), K=IGO, ISTOP) RETURN LAYER 89	DO 301 IGO=1.KBHX.IREC	LAYER 30
IF (ISTOP.GT.KBHX) IS TOP=KBHX 301 WRITE (ISOUT.1) IGC, ISTOP, (ZBH(K), K=IGO, ISTOP) WRITE (ISOUT.4) DO 313 IGO=1, KBHX, IREC ISTOP=IGO*IREC-1 IF (ISTOP.GT.KBHX) ISTOP=KBHX 303 WRITE (ISOUT.1) IGC, ISTOP, (ZCH(K), K=IGO, ISTOP) RETURN LAYER 89	ISTOP=IGO+IREC-1	LAYER 81
WRITE(ISOUT,4) DO 313 IGO=1,KBHX,IREC ISTOP=IGO@IREC-1 IF(ISTOP.GT.KBHX) ISTOP=KBHX 303 WRITE(ISOUT,1)IGO,ISTOP, (ZCH(K),K=IGO,ISTOP) RETURN LAYER 84 LAYER 85 LAYER 86 LAYER 87 LAYER 88	IF(ISTOP.GT.KBHX) IS TOP=KBHX	LAYER 82
WRITE(ISOUT,4) DO 313 IGO=1,KBHX,IREC ISTOP=IGO@IREC-1 IF(ISTOP.GT.KBHX) ISTOP=KBHX 303 WRITE(ISOUT,1)IGO,ISTOP, (ZCH(K),K=IGO,ISTOP) RETURN LAYER 84 LAYER 85 LAYER 86 LAYER 87 LAYER 88	301 WRITE(ISOUT.1)IGC.ISTOP.(ZBH(K).K=IGO.ISTOP)	LAYER 83
ISTOP=IGO*IREC-1 IF(ISTOP.GT.KBHX) ISTOP=KBHX LAYER 87 303 WRITE(ISOUT,1)IGC,1STOP, (ZCH(K),K=IGO,ISTOP) RETURN LAYER 89		LAYER 84
IF(ISTOP.GT.KBHX) ISTOP=KBHX 303 WRITE(ISOUT,1)IGG,ISTOP, (ZCH(K),K=IGO,ISTOP) RETURN LAYER 89	DO 313 IGO=1.KBHX.IREC	LAYER 05
303 WRITE(ISOUT,1)IGG,1STOP, (ZCH(K), K=IGO,1STOP) RETURN LAYER 89	ISTOP=IGO*IREC-1	LAYER 86
RETURN LAYER 89	IF(ISTOP.GT.KBHX) ISTOP=KBHX	LAYER 87
RETURN LAYER 89		
		- · · · - · ·
	END	

```
*DECK, NEST
                                                                             NEST
                                                                             NEST
      SUBROUTINE NEST(NET, NETSU, XQ, YQ, NDATA, XL, XR, YL, YU, ICF, JCF, NCF)
C
      MARCH, 1971
                                                                             NEST
      GIVEN THE HORIZONTAL COORDINATES OF A POINT, NEST RETURNS THE
                                                                             NEST
      NET MESH OR SUB-MESH INDEX NOATA AND THE BOUNDARY COORDINATES OF
C
                                                                             NEST
      THE MESH OR SUB-MESH
                                                                             NEST
                                                                                     6
      MESH INDEX IS -999 IF INPUT POINT LIES OUTSIDE ATMOS.
                                                                             NEST
             - PRIMARY HORIZONTAL SPACE RESOLUTION MESH ARRAY
                                                                             NEST
                                                                                     8
      NETSU - HORIZONTAL SPACE RESOLUTION SUB-MESH ARRAY
С
                                                                             NEST
                                                                                     9
             - INPUT POINT > COCRDINATE
                                                                             NEST
                                                                                    10
             - INPUT POINT Y COGRDINATE
C
                                                                             NEST
      NDATA - OUTPUT MESH CR SUB-MESH INDEX
                                                                             NEST
                                                                                    12
      XL
             - OUTPUT MESH OR SUB-MESH LEFT BOUNDARY X COORDINATE
                                                                             NEST
                                                                                    13
      XR
             - OUTPUT MESH OR SUB-MESH RIGHT BOUNDARY X COORDINATE
                                                                             NEST
                                                                                    14
             - OUTPUT MESH (R SUB-MESH LOWER BOUNDARY Y COORDINATE
                                                                             NEST
                                                                                    15
      YU
             - OUTPUT MESH CR SUB-MESH UPPER BOUNDARY Y COORDINATE
                                                                             NEST
                                                                                    16
      COMMON /CNTROL/ IPOUT, ISIN, ISOUT, JPARN, MC(20), NSEQO
                                                                             NEST
                                                                                    17
       COMMON /INDEX/ ICX, JCX, KBHX, LTIMX, NAT, NCX, NCATX
                                                                             NEST
      COMMON /SPACE/ WIN1, XLLC, YLLC, ZMAX, ZMIN, TIMEX
                                                                             NEST
      DIMENSION NET (ICF, JCF) ,NETSU(NCF)
                                                                             NEST
                                                                                    20
      DATA PROGRM/6HNEST
                                                                             NEST
COPPUTE MESH INDICES IC AND JC FOR (XQ,YQ)
                                                                             NEST
                                                                                    22
      IC=(XQ-XLLC)/WINT+1.
                                                                             NEST
                                                                                    23
      JC= (YQ-YLLC)/WINT+1.
                                                                             NEST
                                                                                    24
COMMENCE MESH SEARCH
                                                                             NEST
                                                                                    25
CHECK IF IC (JC) LIES BETWEEN 1 AND ICX (JCX)
                                                                             NEST
                                                                                    26
      IF((IC.GE.1).AND.(JC.GE.1).AND.(IC.LE.ICX).AND.(JC.LE.JCX))GO TO 1NEST
                                                                                    27
CANCEL MESH SEARCH. (XQ,YG) LIES OUTSIDE ATMOS.
                                                                             NEST
                                                                                    28
      NDA TA=-999
                                                                             NEST
                                                                                    29
      RETURN
                                                                             NEST
                                                                                    30
COMPUTE XL, XR, YL, AND YU FOR MESH
                                                                             NEST
                                                                                    31
    1 VINT=WINT
                                                                             NEST
                                                                                    32
      XL=VINT*FLOAT(IC-1)+XLLC
                                                                             NEST
                                                                                    33
      XR=VINT*FLOAT(IC)+XLLC
                                                                             NEST
                                                                                    34
      YL=VINT*FI.OAT (JC-1)+YLLC
                                                                             NEST
                                                                                    35
      YU=VINT *FLUAT (JC) +YLLC
                                                                             NEST
                                                                                    36
CHECK SIGN OF MET(IC.JC)
                                                                             NEST
                                                                                    37
      IF(NET(IC, JC)) 4,2,3
                                                                             NEST
                                                                                    38
    2 CALL ERROR(PROGRM, -2, ISOUT)
                                                                             NEST
                                                                                    39
CONCLUDE MESH SEARCH
                                                                             NEST
                                                                                    40
    3 NDATA=NET(IC.JC)
                                                                             NEST
                                                                                    41
      PETURN
                                                                             NEST
                                                                                    42
COMMENCE QUADRANY SEARCH. CBTAIN POINTER NO
                                                                             NEST
                                                                                    43
    4 NQ=-NET (IC, JC)
                                                                             NEST
                                                                                    44
COMPUTE QUADRANT INDICES IC AND JQ FOR (XQ,YQ)
                                                                             NEST
                                                                                    45
    5 VINT=VINT/2.
                                                                             NEST
                                                                                    46
      IQ=(XQ-XL)/VINT
                                                                             NEST
                                                                                    47
      JQ=(YQ-YL)/VINT
                                                                             NEST
                                                                                    48
CONVERT NO TO QUADRANT LABEL
                                                                             NEST
                                                                                    49
      NQ=NQ+3*IQ+JQ-2*IQ*JC
                                                                             NEST
                                                                                    50
COMPUTE XL, XR, YL, AND YU FOR QUADRANT
                                                                              NEST
                                                                                    51
      XR=XL+VINT*FLOAT (IQ < 1)
                                                                              NEST
                                                                                    52
      XL=XL+VINT*FLOAT(IC)
                                                                             NEST
                                                                                    53
      YU=YL+VINT*FLOAT(JG+1)
                                                                             NEST
                                                                                    54
      YL=YL+VINT*FLOAT (JQ)
                                                                             NEST
                                                                                    55
CHECK SIGN OF NETSU(NQ)
                                                                             NEST
                                                                                    56
      IF(NETSU(NQ)) 7,6,8
                                                                             NEST
                                                                                    57
    6 CALL FRROR(PROGRM,-6,ISOUT)
                                                                             NEST
                                                                                    58
CONTINUE QUADRANT SEARCH. CBTAIN POINTER NO
                                                                             NEST
                                                                                    59
    7 NQ=-NETSU(NQ)
                                                                             NEST
                                                                                    60
```

Control of the contro

```
RETURN
                                                                           NEST
                                                                                  64
      FNO
                                                                           NEST
                                                                                  65
*DECK.ONEDIN
                                                                            ONEDI
      SUBROUTINE ONEDIN(ZCH, ZBH, CAVS, DX
                                            ,DY
                                                  ,LTIM, KBHF, NDATF, LTIMF, ONEDI
     1 FORM, SPEC)
                                                                            ONEDI
                                                                                   3
C
                                                                            ONEDI
C
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                            ONEDI
                                                                                   5
                                                                                   6
                                                                            ONEDI
                                                                          ** ONEDI
                                                                                   7
                                                                            ONEDI
                                                                                   8
                                                                                   9
C
      READS AND PROCESSES HIND/TURBULENCE DATA FOR A HORIZONTALLY
                                                                            ONEDI
C
      HUMOGENIOUS FIELD. VERTICAL COMPONENTS ARE NOT CONSIDERED.
                                                                            DI ICANO
                                                                            ONEDI 11
                                                                           PONEDI
C
                                                                            UNEDI 13
                                                                            ONEDI 14
      COMMON /CNTROL/ IPOUT, ISIN, ISOUT, JPARN, MC(20), NSEQO
       COMMON /INDEX/ ICX, JCX, KBHX, LTIMX, NAT, NCX, NDATX
                                                                            ONEDI 15
      COMMON /SPACE/ WINT, XLLC, YLLC, ZMAX, ZMIN, TIMEX
                                                                            ONEDI 16
C
                                                                            ONEDI 17
      INTEGER WIND, TURB, METEOR, RESOLV, SPEC, FORM
                                                                            ONEDI 18
      DIMENSION ZCH(KBHF), ZBH(KBHF), DX(KBHF, NOATF, LTIMF), CAVS(KBHF)
                                                                            ONEDI 19
      DIMENSION FHT(12), SCALE(5), AP(3), DY(KBHF, NDATF, LTIMF)
                                                                            ONEDI 20
                                                                            ONEDI 21

    PROGRM

                                           , METEOR , RESCLV, WIND , TURB
                                                                            ONEDI 22
      DATA ALIMIT , RADC
       / 99999. ..0174532925, 6HONEDIN, 4HMETE ,4HRESO,4HWIND,4HTURB/UNEDI 23
                                                                            ONEDI 24
      DATA IREC/8/
                                                                            ONEDI 25
    1 FORMAT( 4X, 6HLEVELS, 14, 5H THRU, 14, 8F12.5)
                                                                            ONEDI 26
    3 FORMAT( ////33X. 25HWIND LAYER BASE ALTITUDES/)
                                                                            UNEDI 27
    4 FORMAT(1H03X31HMAXIMUM WIND SPACE ALTITUDE IS E12.5.7H METERS)
                                                                            ONEDI 28
                                                                            ONEDI 29
 1000 FORMAT (12A6)
 1100 FORMAT (8F10.0)
                                                                            UNEDI 30
                                                                            ONEDI
 1200 FORMAT (2014)
                                                                                  31
                    16X, 13HRAW KIND DATA,33X,19HPROCESSED WIND DATA//8X, ONEDI
 1300 FORMAT(
                                                                                  32
     11HZ, 9X, 10HVX OR DIR., 3X, 11HVY OR SPEED, 14X, 1HZ, 12X,
                                                                            ONEDI 33
                                                                            ONEDI 34
     2 2HVX, 12X, 2HVY/)
 1400 FORMAT (3(2X, 1PE12.5))
                                                                            ONEDI 35
 1500 FORMAT (1H+ 47X, 3(2X, 1PE12.5))
                                                                            ONEDI 36
 1600 FORMAT( 10X19HRAW TURBULENCE DATA, 28X25HPROCESSED TURBULENCE DATAUNEDI 37
                                                                            UNEDI 38
     1//3X, 1HZ, 1CX, 4HEPSX, 1OX, 4HEPSY, 17X, 1HZ, 11X 4HEPSX, 1OX,
     2 4HEPSY/)
                                                                            ONEDI 39
       FORMAT ( 1Hú, 5%, 63HNUMBER OF WIND OR TURBULENCE INFUT DATA INCONONEDI 40
     1SISTENT FOR UPDATEI4)
                                                                            ONEDI
                                                                                  41
 1800 FORMATI 1HO, 5X, 59HWIND OR TURBULENCE STRATA ALTITUDES INCONSISTEUNEDI 42
                                                                            ONEDI 43
     1NT FOR UPDATEI4)
                                                                            ONEDI 44
CHECK FORM AND SPEC
                                                                            ONFDI 45
      IF(SPEC .EQ. WIND
                          . AND.
                                  FORM .EQ. METEOR) GO TO 25
                                                                            ONEDI 46
   20 IF(SPLC .EQ. WIND
                          . AND .
                                  FORM .NE. RESOLV) CALL ERROR (PROGRM, -20, ONEDI 47
                                                                            ONEDI 48
       I SOUT)
COPY IN FORMAT, SCALE & FIELD POINTERS
                                                                            UNEDI 49
                                                                            ONEDI 50
   25 READ (ISIN, 1000)FMT
```

GO TO 5

CONCLUDE QUADRANT SEARCH

8 NDATA=NETSU(NQ)

NEST

NEST

NEST

61

62

63

<u>1880 a manda a Babasa 1870, dalah menggulah dalah bahan bahan dalah Aktoobah</u> 1860 asa Milasa da Milasa dalah bah

```
READ (ISIN, 1100) SCALE
                                                                           ONEDI 51
      READ (ISIN, 1200) N1, N2, N3
                                                                           ONEDI 52
      00 50 I = 1.3
                                                                           ONEDI 53
  50
         IF(SCALE(I).EQ. 0.0) SCALE (I) = 1.0
                                                                           ONEOI 54
      IF(FORM .EQ. METEOR) TRNS=SCALE(5)*SCALE(3) - 180.
                                                                           ONEDI 55
      IF(MC(2) .NE. 1 .AND. SPEC .EQ. WIND) WRITE(ISCUT,1300)
                                                                           ONEDI 56
                              SPEC .EQ. TURB) WRITE(ISCUT, 1600)
      IF (MC(2) . NE. 1
                       .ANE.
                                                                           ONEDI 57
                                                                           ONEDI 58
COPY IN, PRINT RAW DATA, TRANSLATE AND SCALE DATA, AND PRINT PROCESSED
                                                                           ONEDI 59
C
      PATA
                                                                           ONEDI 60
 100
      READ (ISIN, FMT) AP
                                                                           ONEDI 61
      IF(AP(N1).GE.ALIMIT)GO TO 250
                                                                           ONEDI 62
      IF(MC( 2 ) .NE. 1
                          ) WRITE(ISOUT, 140J)AP(N1), AP(N2), AP(N3)
                                                                           ONEDI 63
      KBH = KBH + 1
                                                                           UNEDI 64
      CAVS(KBH) = (AP(N1) + SCALE(4)) + SCALE(1)
                                                                           UNEDI 65
      IF(FORM.EQ.RESOLV) GO TO 150
                                                                           ONEDI 66
      DX(KBH,1,LTIM)=AP(N3)*SCALE(2)*SIN(RADC*(AP(N2)*SCALE(3) + TRNS)*) ONEDI 67
      DY(KBH,1,LTIM)=AP(N3)*SCALE(2)*COS(RADC*(AP(N2)*SCALE(3) + TRNS)) ONEDI 68
      GO TO 200
                                                                           ONEDI 69
 150
      DX(KBH,1,LTIM) = AP(N2)*SCALE(2)
                                                                           ONEDI 70
      DY(KBH,1,LTIM) = AP(N3)*SCALE(2)
                                                                           ONEDI 71
  230 IF(MC( 2).NE. 1) WRITE (ISOUT, 1500) CAVS(KBH), DX(KBH, 1, LTIM),
                                                                           ONEDI 72
                                                                           ONEDI 73
     1DY(KBH, 1, LTIM)
      GO TO 100
                                                                           ONEDI 74
                                                                           ONEDI 75
  250 IF(LTIP .EQ. 1) KBHX=KBH
CHECK IF THE NUMBER OF DATA VECTORS IS CONSISTENT
                                                                           ONEDI 76
  251 IF(LTIM .EQ. 1 .OR. KBH .EQ. KBHX) GO TO 253
                                                                           ONEDI 77
                                                                           ONEDI 78
      WRITE(ISOUT,1700)LTIM
COMMINGLE DATA TO ARRANGE IT IN ORDER OF ASCENDING ALTITUDE
                                                                           ONEDI
                                                                                 79
  253 KBHM1 = KBHX - 1
                                                                           UNEDI 80
      DO 255 I=1, KBHM1
                                                                           ONEDI 81
      IP1=I+1
                                                                           ONEDI 82
      DO 255 J=IP1,KBHX
                                                                           ONEDI 83
      IF(CAVS(I) .LE. CAVS(J)) GO TO 255
                                                                           UNEDI 84
                                                                           ONEDI 85
      TEMP=CAVS(I)
                                                                           ONEDI 86
      CAVS(I) = CAVS(J)
      CAVS(J) = TEMP
                                                                           ONEDI 87
      TEMP=DX(I,1,LTIM)
                                                                           ONEDI 88
                                                                           ONEDI 89
      DX(I,1,LTIM)=DX(J,1,LTIM)
                                                                           ONEDI 90
      DX(J,1,LTIM)=TEMP
      TEMP=DY(I,1,LTIM)
                                                                           ONEDI 91
      DY(I,1,LTIM)=DY(J,1,LTIM)
                                                                           ONEDI 92
      DY(J,1,LTIM)=TEMP
                                                                           ONEDI 93
                                                                           ONEDI 94
  255 CONTINUE
      IF(LTIM .EQ. 1 .AN(. SPEC .EQ. HIND) GO TO 259
                                                                           UNEDI 95
CHECK STRATA ALTITUDES AGAINST THOSE FOR THE LTIM=1 WIND DATA
                                                                           ONEDI
                                                                                 96
      DO 258 I=1,KBHM1
                                                                           ONEDI 97
      IF(CAVS(I) .GE. ZBH(I) .AND. CAVS(I) .LE. ZBH(I+1)) GO TO 258
                                                                           ONEDI 98
      WRITE (ISOUT, 18 38) LTIM
                                                                           ONEDI 99
      CALL ERROR(PROGRM,-258, ISOUT)
                                                                           UNEDI140
  258 CONTINUE
                                                                           ONEDI111
      RETURN
                                                                           ONEDI112
CONSTRUCT WIND LAYER BASE ALTITUDES IN ARRAY ZBH AND LOAG CENTER
                                                                           UNEDI103
      ALTITUDES INTO ZCH
                                                                           ONEDI14
                                                                           ONEDI105
  259 ZBH(1) = ZMIN
      ZCH(1) = CAVS(1)
                                                                           ONEDI116
                                                                           UNEDI107
      DO 260 I=2,KBHX
      ZCH(I)=CAVS(I)
                                                                           ONEDI1J8
      ZBH(I) = 2.0 + ZCH(I-1) - ZBH(I-1)
                                                                           ONEDI119
      ZMAX=2.0+ZCH(KBHX)-ZBH(KBHX)
                                                                           ONEDI110
```

```
COPY OUT WIND LAYER BASE CATA
                                                                              ONEDI111
                                                                               ONEDI112
      WRITE (ISOUT, 3)
      DO 270 IGO=1,KBHX, IREC
                                                                              ONEDI113
      ISTOP=IGO+IREC-1
                                                                              ONED I114
                                                                              ONEDI115
      IF(ISTOP.GT.KBHX) ISTOP=KBHX
                                                                               ONEDI116
  270 WRITE (ISOUT, 1) IGC, ISTOP, (ZBH(K), K=IGO, ISTOP)
                                                                              ONEDI117
      WRITE(ISOUT, 4) ZMAX
                                                                               ONEDI118
      RETURN
                                                                              ONEDI119
      END
```

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SPRVS
*DECK, SPRVS
      SUBROUTINE SPRVS(NET,NETSU, 28H, ZCH, TIMUP, USUM, VSUM, DXSUM, DYSUM,
                                                                              SPRVS
     1RSUM.WFZ.CAVS.HDAV.TSUM.WAVG.ALT.ATP.PRS.RLH.RHC.ETA.
                                                                              SPRVS
                                                                              SPRVS
     2ICF, JCF, NCF, KBHF, NCA 1F, L TIMF, NATE)
                                                                              SPRVS
                                                                                     5
C
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                              SPRVS
C
                                                                                     6
                                                                              SPRYS
                                                                                     7
C
                                                                            **SPRVS
                                                                                     8
                                                                              SPRVS
                                                                                     q
      SUBROUTINE SPRVS SUPERVISES DIFFUSIVE. TRANSFORT
                                                                              SPRVS 10
С
                                                                              SPRVS
C
      OF FALLOUT PARCELS LISTED ON TAPE JPARN. PARCEL PARAMETERS ARE
                                                                                    11
      STORED IN ARRAYS XPAR.YPAR.ZPAR.TPAR.PDAM.PSAM.RWFR.DWFR.ZLWF.VHFRSPRVS
C
      ONLY ONE PARCEL IS TRANSPORTED AT A TIME. FOR THIS PARCEL ABOVE
                                                                              SPRVS 13
      ITEMS ARE STORED IN XP, YP, ZP, TP, PSIZ, PMAS, RWAF, DWAF, ZLOW, VWAF.
                                                                              SPRVS 14
C
C
      XPAR
            - X COURDINATE OF FARCEL CENTER
                                                                              SPRVS 15
      YPAR
             - Y COORDINATE OF PARCEL CENTER
                                                                              SPRVS 16
C
                                                                              SPRVS 17
C
            - Z COORDINATE OF FARCEL CENTER
      ZPAR
      TPAR
                                                                              SPRVS 18
C
            - TIME OF DEFINITION OF GLOUD PARCEL
C
      PDAM
            - MIDPOINT OF PARCEL PARTICLE SIZE CLASS
                                                                              SPRVS 19
               TOTAL MASS OF PARCEL
C
                                                                              SPRVS 20
      PSAM
                                                                              SPRVS 21
C
      RHFR
               RADIUS OF PARCEL AT CENTER OF MASS
      DWFR
             - PARCEL THICKNESS
                                                                              SPRVS 22
C
                                                                              SPRVS 23
C
      ZLWF
             - ALTITUDE OF FARCEL BASE
C
      VWFR
            - PARCEL VOLUME
                                                                              SPRVS 24
                                                                              SPRVS 25
C
C
                                                                        **** SPRVS 26
C
                                                                              SPRVS 27
      COMMON /CNTROL/ IPOUT, ISIN, ISOUT, JPARN, MC(20), NSEQO
                                                                              SPRVS 28
       COMMON /INDEX/ ICX, JCX, KBHX, LTIMX, NAT, NCX, NDATX
                                                                              SPRVS 29
       COMMON /PARCL/ CRCSS, DOWN, DWAF, EDDY, NDATP, PMAS, PSIZ, RHOP, RWAF,
                                                                              SPRVS 30
     1 TP, XP, YP, ZLOW, ZP
                                                                              SPRVS 31
      COMMON /SPACE/ WINT. XLLC .YLLC .ZMAX. ZMIN. TIMEX
                                                                              SPRVS 32
                                                                              SPKVS 33
C
                                                                              SPRVS 34
      DIMENSION ALT (NATF), ATP (NATF), PRS (NATF), RHC (NATF), ETA (NATF)
      DIMENSION NET (ICF, JCF), NETSU(NCF), ZBH(KBHF), ZGH(KBHF), HDAV(LTIHF) SPRVS 35
       DIMENSION USUM (KBHF, NDATF, LTIMF), VSUM (KBHF, NDATF, LTIMF), CAVS (KBHF) SPRVS 36
       CIMENSION DXSUM(KBHF, NDATF, LTIMF), DYSUM(KBHF, NDATF, LTIMF)
                                                                              SPRVS 37
      DIMENSION WFZ(KBHF, NCATF, LTIMF), WAVG(KBHF, LTIMF), TIMUP(LTIMF)
                                                                              SPRVS 38
                                                                              SPRVS 39
      DIMENSION RSUM(KBHF, NDATF, LTIMF), TSUM(KBHF)
       DIMENSION XPAR(100), YPAR(100), ZPAR(100), TPAR(100), PDAM(100)
                                                                              SPRVS 40
                                                                              SPRVS 41
      DIMENSION PSAM(100), RWFR(100), DWFR(100), ZLWF(100), VWFR(100)
С
                                                                              SPRVS 42
                                                                              SPRVS 43
       DATA PROGRM/6HSPRVS / .JF/100/
                                                                              SPRVS 44
 8015 FORMAT( 1H+, 102X, 8HAIRBORNE)
                                                                              SPRVS 45
                                                                              SPKVS 46
 8016 FORMAT( 1H , 14, 8E12.4)
                                          125
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8017 FORMAT(1HJ.5X, 86H* * * * * SHORT-CUT TRANSPORT IS CANCELLED BECAUSPRVS 47
     1SE VERTICAL WIND IS NON-ZERO + + * + *//)
                                                                           SPRVS 48
 8019 FORMAT ( 1H+, 102X,
                             9H IMPACTED)
                                                                           SPRVS 49
 8020 FORMAT( 1H+, 1J2X, 17HOUTSIDE WINDSPACE)
                                                                           SPRVS 50
 8021 FORMAT( 1H0, 36X, 21HPARTICLE DIAMETER IS E12.5, 7H METERS)
                                                                           SPRVS 51
                     9HFALL RATEE12.5.23H METERS/SEC AT ALTITUDEE12.5.
 3022 FORMAT( 23X.
                                                                           SPRVS 52
     1 7H METERS/ 23X, 37HUPPER LINIT ALTITUDE FOR IMPACTION ISE12.5,
                                                                           SPRVS 53
      7H METERS)
                                                                           SPRVS 54
 8724 FORMAT( 2X, 4HNSEQ, 6X, 2HXP, 10X, 2HYP, 16X, 2HZP, 10X, 2HTP,
                                                                           SPRVS 55
     1 9X, 4HPMAS, 8X, 4HRWAF, 8X, 4HZLOW, 8X, 4HDWAF/)
                                                                           SPRVS 96
 8025 FORMAT( 1H1, 38X, 31 PRE-TRANSPORT PARCEL FROPERTIES/)
                                                                           SPRVS 57
C
                                                                           SPRVS 58
COMPUTE TURBULENCE PARAMETER AVERAGED OVER ALL SPACE, HAV
                                                                           SPRVS 59
      HAV=0.
                                                                           SPKVS 60
      DO 40 L=1.LTIMX
                                                                           SPRVS 61
   40 HAV=HAV + HDAV(L)
                                                                           SPRVS 62
      HAV=HAV/LTIMX
                                                                           SPRVS 63
CHOOSE STANDARD DEVIATION OF VERTICAL TURBULENCE
                                                                           SPRVS 64
      SIGW=EDDY
                                                                           SPRVS 65
      IF(MC(6) .GT. 0) SIGW=5.39*(HAV)**(1.0/3.0)
                                                                           SPRVS 66
                                                                           SPRVS 67
      MC3=MC(3)
      IF (MC3 .GT. 0) WRITE (ISOUT.8)25)
                                                                           SPRVS 68
                                                                           SPRVS 69
      NSE Q≈ C
      PSZBE=-2.0
                                                                           SPRVS 70
      IF(MC( 4 ).NE.8) GO 10 47
                                                                           SPRVS 71
CANCEL SHORT-CUT TRANSPORT IF VERTICAL WIND IS NON-ZERO
                                                                           SPRVS 72
      DO 45 L=1, LTIMX
                                                                           SPRVS 73
      DO 45 K=1,KBHX
                                                                           SPRVS 74
      IF (WAVG (K.L).NE. C. 0) GO TO 48
                                                                           SPRVS 75
  45 CONTINUE
                                                                           SPRVS 76
      GO TO 47
                                                                           SPRVS 77
  46 MC( 4 )=1
                                                                           SPRVS 78
                                                                           SPRVS 79
      WRITE(ISOUT,8017)
  47
                                                                           SPRVS 80
      CONTINUE
CCMPUTE OVERALL AVERAGE VERTICAL VELOCITY
                                                                           SPRVS 81
      KBHM1=KBHX-1
                                                                           SPRVS 82
      WAVGK=0()
                                                                           SPRVS 03
                                                                           SPRVS 84
      DO 51 L=1,LTIMX
      DO 50 K=1, KBHM1
                                                                           SPRVS 85
   50 HAVGK=WAVGK + HAVG(K,L)+(ZBH(K+1) - ZBH(K))
                                                                           SPRVS 86
   51 WAJGK = WAJGK + WAJG(KBHX,L)+(ZMAX - ZBH(KBHX))
                                                                           SPRVS 57
      WAVGK=WAVGK/(LTIMX*(Imax-ZMIN))
                                                                           SPRVS 38
COMPUTE TIMEX MARGIN FACTOR FOR AIRBORNE TEST
                                                                           SPRVS 89
      IF (NDATX-1) 70,70,60
                                                                           SPRVS 30
   60 SLOP=1.1
                                                                           SPRVS 91
      GO TO 100
                                                                           SPRVS 92
                                                                           SPRVS 93
   79 SLOP=1.0
COPY IN PARCEL BLOCK COUNT
                                                                           SPRVS 94
      READ (JPARN) NP
                                                                           SPRVS 35
                                                                           SPKVS 96
      IF(NP.LE.O) GO TO 80E
      IF (NP.GT.JF) CALL EFFOR (FROGRM, -100, ISOUT)
                                                                           SPRVS 97
COPY IN A BLOCK OF INPUT FARCEL PARAMETERS
                                                                           SPRVS 98
      READ(JPARN) (XPAR(J), YPAR(J), ZPAR(J), TPAR(J), PCAM(J), PSAM(J),
                                                                           SPRVS 99
     1RWFR(J), DWFR(J), ZLWF(J), VWFR(J), J=1, NP)
                                                                           SPKVS1J0
                                                                           SPRVS131
COMMENCE PROCESSING BLOCK OF INPUT PARCELS ONE AT A TIME
      DO 1000 J=1,NP
                                                                           SPRVS1J2
      NSEQ=NSEQ+1
                                                                           SPRVS133
      IF(NSEQ.LT.NSEQO) GC TO 1030
                                                                           SPKVS1J4
      XP=XPAR(J)
                                                                           SPRVS115
      YP=YPAR(J)
                                                                           SPRVS1.6
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ZP=ZPAR (J)
                                                                            SPRVS117
      TP=TPAR (J)
                                                                            SPRVS108
      PSIZ=PDAM(J)
                                                                            SPRVS109
      PMAS=PSAM(J)
                                                                            SPRVS110
      RWAF=RWFR(J)/2.
                                                                            SPRVS111
      DWAF=OWFR(J)
                                                                            SPRVS112
      ZLOW=ZLWF(J)
                                                                            SPRVS113
      VWAF=VWFR(J)
                                                                            SPRVS114
                                                                            SPRVS115
CHECK FOR NEW PARTICLE SIZE CLASS
      IF (ABS((PSIZ-PSZBE)/FSIZ).LE.1.0E-10) GU TO 103
                                                                            SPRVS116
      IF( MC3 .GT. 0) WRITE(ISCUT, 8021) PSIZ
                                                                            SPRVS117
                                                                            SPRVS118
COMPUTE MID-ATMOSPHERE FALL RATE FAV FOR NEW PARTICLE SIZE CLASS
                                                                            SPRVS119
      H=(ZMIN+ZMAX)/2.
      CALL TRPL(H, NAT, ALT, ATP, T)
                                                                            SPRVS120
                                                                            SPRVS121
      CALL TRPL(H, NAT, ALT, FRS, F)
      CALL TRPL(H,NAT, ALT,RHO, DEN)
                                                                            SPRVS122
      CALL TRPL(H, NAT, ALT, ETA, VIS)
                                                                            SPRVS123
      CALL SETTLE (PSIZ, RHOF, DEN, VIS, T, P, FAV, IACCR)
                                                                            SPRVS124
      FAV=FAV-WAVGK
                                                                            SPRVS125
COMPUTE TABLE OF PARTICLE SETTLING SPEEDS - AN ENTRY FOR EACH STRATUM
                                                                            SPRVS 1.26
      DO 101 KKZ=1+KBHX
                                                                            SPRVS127
      CALL TRPL(ZCH(KKZ), NAT, ALT, ATP, T)
                                                                            SPRVS128
      CALL TRPL(ZCH(KKZ), NAT, ALT, PRS, P)
                                                                            SPRVS129
                                                                            SPRVS130
      CALL TRPL(ZCH(KKZ), NAT, ALT, RHO, DEN)
      CALL TRPL(ZCH(KKZ), NAT, ALT, ETA, VIS)
                                                                            SPRVS131
  101 CALL SETTLE (PSIZ, RHOF, CEN, VIS, T, P, CAVS (KKZ), IACCH)
                                                                            SPRVS132
COMPUTE INITIAL ALTITUDE FOR THIS PARTICLE SIZE ABOVE WHICH DEPOSITION
                                                                            SPRVS133
CANNOT OCCUR
                                                                            SPRVS134
      TMAX=TP
                                                                            SPRVS135
                                                                            SPRVS136
      DO 1001 IZ=1,K8HM1
      TMAX=TMAX + (ZBH(IZ+1) - ZBH(IZ))/(CAVS(IZ) - WAYGK)
                                                                            SPRVS137
      IF (TMAX.GT.SLOP*TIMEX .OR. TMAX .LT. 0.0 ) GO TO 1002
                                                                            SPRVS138
                                                                            SPRVS139
 1001 CONTENUE
      TMAX=TMAX + (ZMAX - ZBH(KBHX))/(CAVS(KBHX) - WAVGK)
                                                                            SPRVS140
                                                                            SPRVS141
      ZLIM=5.0E4
      IF (TMAX.GT.SLOP#TIMEX .OR. TMAX .LT. J.D ) ZLIM=ZMAX
                                                                            SPRVS142
                                                                            SPRVS143
      GO TO 1012
 1002 ZLIM=ZBH(IZ+1)
                                                                            SPRVS144
                                                                            SPRVS145
 1012 IF(THAX .LT. 0.0) TMAX=TIMEX
                                                                            SPRVS146
 1003 IF( MC3 .LT. 1) GO TC 1004
      WRITE (ISOUT, & 022) FAV, H, ZLIM
                                                                            SPRVS147
                                                                            SPRVS148
      WRITE (ISOUT, 6024)
                                                                            SPRVS149
 1004 CONTINUE
      IF(MG( 4 ).NE.0) GO TO 1255
                                                                            SPRVS150
COMPUTE DEPOSITION TIME FROM THE BASE OF EACH STRATUM FOR USE BY THE
                                                                            SPRVS151
                                                                            SPRVS152
C
      SHORT-CUT TRANSPORT METHOD
                                                                            SPRVS153
      TSUM(1) = 0.0
                                                                             SPRVS154
      00 1250 K=2.KBHX
                                                                             SPRVS155
 1250 TSUM(K)=TSUM(K-1)+(ZBH(K) - ZBH(K-1))/CAVS(K-1)
                                                                            SPRVS156
 1255 CONTINUE
COMPUTE CROSSING-TRAJECTORIES DIFFUSIVITY CORRECTIONS FOR NEW PARTICLE
                                                                            SPRVS157
                                                                            SPRVS158
      SIZE CLASS.
                                                                            SPRVS159
      DOWN=(FAV*ELJY/SIGH)**2
                                                                            SPRVS160
      CROSS=1./SQRT(1.+4.*COWN)
      DOWN=1./SQRT(1.+DOWN)
                                                                            SPRVS161
      PSZBE=PSIZ
                                                                            SPRVS162
                                                                            SPRVS163
  103 IF( MC3 .GT. 0)
     1HRITE(ISOUT, 8016) NSEQ, XP, YP, ZP, TP, PMAS, RWAF, ZLCW, DHAF
                                                                            SPRVS164
CANCEL PROCESSING OF PARCEL IF IT HAS ALREADY IMPACTED
                                                                            SPRVS165
                                                                            SPRVS166
      IF (IFIX(DWAF).GT.0) GO TO 1200
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IF( MC3 .GT. 0) WRITE(ISOUT,8J19)
                                                                             SPRVS167
      CALL
                  DUMPER(XF,YP,ZP,TP, RWAF, RWAF, PMAS,FSIZ,0.,0,
                                                                             SPRVS168
     1ISOUT, I POUT, MC3)
                                                                             SPRVS169
      GO TO 1,000
                                                                             SPRVS170
COMPUTE INDEX OF MESH OR SUB-MESH CONTAINING PARCEL CENTER
                                                                             SPRVS171
 1200 CALL NEST(NET.NETSU.XP,YP,NDATP.XL,XR,YL,YU,ICF.JCF.NCF)
                                                                             SPRVS172
CANCEL PROCESSING OF PARCEL IF IT IS INPUT OUTSIDE ATMOS.
                                                                             SPRVS173
      IF(NDATP.GT.U) GO TO 1260
                                                                             SPRVS174
      IF( MC3 .GT. 0) WRITE(IS(UT,8020)
                                                                             SPRVS175
      GO TO 1000
                                                                             SPRVS176
CANCEL PROCESSING OF PARCEL IF IT CANNOT REACH THE GROUND IN THE ALLOTEDSPRYS177
      TIME
                                                                             SPRVS178
 1260 IF(ZLOW.LT.ZLIM) GO 10 1409
                                                                             SPRVS179
      IF( MC3 .GT. 0) WRITE(ISCUT, 8015)
                                                                             SPRVS180
      GO TO 1000
                                                                             SPRVS181
 1409 CALL
                                                                             SPRVS182
                  ADVEC (NET, NETSU, ZBH, TINUP, USUM, VSUM, DXSUM, DYSUM, RSUM,
     1WFZ.TSUM, CAVS.ZCH, ALT, ATP, PRS, RHC, ETA, TMAX,
                                                                             SPRVS183
     2 ICF, JCF, NCF, KBHF, NCATF, LTIMF, NATF)
                                                                             SPRVS184
 1860 CONTINUE
                                                                             SPRVS145
      GO TO 130
                                                                             SPRVS186
COPY OUT BUFFER DATA VECTORS FOR DRY DEPOSIT INGREPENTS.
                                                              WA FER
                                                                             SPRVS187
      PROCESSING HAS BEEN COMPLETED
                                                                             SPRVS188
  806 CALL
                  DUMPER(0.,J., Q.,O.,
                                                            u., J., 999.
                                                                             SPRVS189
                                                9 - -
                                                       3 . a
     1ISOUT, IPOUT, MC3)
                                                                             SPRVS130
                  DUMPER (0.,0., 0., 0.,
      CALL
                                                                             SPRVS191
                                                            C., O., 999,
     1ISOUT, IPOUT, MC3)
                                                                             SPRVS192
      REWIND JPARN
                                                                             SPRVS193
       ENDFILE IPOUT
                                                                             SPRVS134
      REWIND IPOUT
                                                                             SPRVS135
      RETURN
                                                                             SPRVS196
      END
                                                                             SPRVS197
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*DECK.SUMDAT
      SUBROUTINE SUMDAT(NET.NETSU,ZBH,ZCH,WAYG,HDAV,USUM,VSUM,RSUM,WFZ, SUMDA
     1TIMUP.OXSUM.DYSUM.ICF.JCF.NCF.K8HF.NDATF.LTIMF)
                                                                           SUMDA
                                                                                   3
C
                                                                           SUMDA
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
C
                                                                           SUMDA
                                                                                   5
C
                                                                           SUMDA
                                                                                   6
                                                                           *SUMDA
                                                                                   7
C
                                                                           SUMDA
                                                                                   8
C
     SUMS AND WEIGHTS WINC AND TURBULENCE DATA FROM ZEIN TO ZBH(KBHX)
                                                                           SUMDA
                                                                                   q
C
      FOR USE BY THE FAST TRANSPORT CALCULATIONS
                                                                           SUMDA 10
C
                                                                           SUMDA 11
C
      AREA - AREA OF HORIZA SPACE NET
                                                                           SUMDA 12
      AREAN - AREA OF A PARTICULAR MESH
C
                                                                           SUMDA 13
                                                                           SUMDA 14
  **** SUMDA 15
                                                                           SUMDA 16
C
      COMMON /CNTROL/ IPOUT, ISIN, ISOUT, JPARN, MC(20), NSEQU
                                                                           SUMDA 17
       COMMON /INDEX/ ICX, JCX, KBHX, LTITX, NAT, NCX, NDATX
                                                                           SUMDA 18
                                                                           SUMDA 19
      COMMON /SPACE/ WINT.XLLC.YLLC.ZMAX,ZMIN.TIMEX
C
                                                                           SUMDA 20
      DIMENSION RSUM(KBHF, NOATF, LTIMF), HDAV(LTIMF), WAVG(KBHF, LTIMF)
                                                                           SUMDA 21
      DIMENSION NET(ICF, JCF), NETSU(NCF), ZCH(KBHF), TIMUF(LTIMF), ZBH(KEHF) SUMDA 22
      DIMENSION DXSUM(KBHF, NDATF, LTIMF), DYSUM(KBHF, NDATF, LTIMF)
                                                                           SUMDA 23
      DIMENSION USUM (KBHF, NDATF, LTIMF), VSUM (KBHF, NDATF, LTIMF)
                                                                           SUMDA 24
      DIMENSION WFZ(KBHF.NDATF.LTIMF)
                                                                           SUMDA 25
                                                                           SUMDA 26
     FORMAT(1HO, 5X, 17FUPDATE TIME INDEXI3, 23H. WIND GRID CELL INSUMDA 27
     1DEXI3, 38H WITH HORIZONTAL CUORDINATES (X,Y) - (E12.5, 1H,, E12.5,5UMDA 26
     2 8H) METERS/)
                                                                            SUMDA 29
    2 FORMAT( 9X, 5HLAYER, 8X, 10HHORIZONTAL, 6X, 10HHORIZONTAL,
                                                                            SUMDA 30
                            9HCROSSWIND, 7X, 8HDOWNWINC,6X10HHORIZONTAL/ SUMDA 31
     1 7X.
      8X, 6HCENTER, 8X, 1(HE.-W. WIND, 6X, 10HN.-S. WIND, 2(6X10HTURBULSUMDA 32
     SENCE), 6x, 8HROTATION/ 8x, 8HALTITUDE, 4(7x9HCOMPONENT), 9x,
                                                                           SUMDA 33
                                                                           SUMDA 34
     4 SHANGLE)
    6 FORMAT(1H1, 40X, 21H WEIGHTED, SUMMED DATA//)
                                                                           SUMDA 35
    8 FORMAT(/23X. 6HUPCATEI4, 6H MESHI4, 32H AVERAGE TURBULENCE PASUMDA 36
     1RAMETER =F12.5)
    9 FORMAT(1H1, 29X, 57HTHREE DIMENSIONAL WIND AND TURBULENCE DATA BEFSUMDA 38
     1 ORE SUMMING/)
                                                                            SUMDA 39
   12 FORMAT( 9X, 5HLAYER, 8X, 10HHORIZONTAL, 6X, 10HHORIZONTAL,
                                                                           SUMDA 46
     1 7X, 8HVERTICAL, 8X, 9HCFOSSWIND, 7X, 8HDOWNWINC,7X1CHHORIZONTAL/ SUMOA 41 2 8X, 6HCENTER, 8X, 10HE.-W. WIND, 6X, 10HN.-S. WIND, 9X, 4HWIND, 3X, SUMDA 42
     3 2(6x, ADHTURBULENCE), 7x, 8HROTATION/ 8x, 8HALTITUDE,
                                                                            SUMDA 43
     4 5(7X, 9HCOMPONENT), 9X, 5HANGLE)
                                                                            SUMDA 44
   13 FORMAT (6E16.4)
                                                                            SUMDA 45
   14 FORMAT (7E16.4)
                                                                            SUMDA 46
   15 FORMAT(1HO, 22X, 55HTURBULENCE PARAMETER AVERAGED OVER ALL SPACE SUMDA 47
     1FOR UPDATEI4.3H ISE12.5)
                                                                            SUMDA 48
   16 FORMAT(1H0,22X48HAVERAGE VERTICAL WIND GCMPONENT FOR EACK LAYER -)SUMDA 49
                                                                            SUMDA 50
   17 FORMAT( 20X. 6(15, F8.3, 1H.))
                                                                            SUMDA 31
                                                                            SUMDA 52
      IF(MC(2) .EQ. 1 .OR. MC(1) .EQ. J) GO TO 20
COPY OUT THREE DIMENSIGNAL WIND AND TURBULENCE DATA BEFORE SUMMING
                                                                            SUMDA 53
      WRITE(ISOUT,9)
                                                                            SUMDA 54
                                                                            SUMDA 55
      DO 50 L=1.LTIMX
      DO 5? N=1.NDATX
                                                                            SUMDA 56
      CALL CNTR(NET, NETSU, N, XG, YG, ICF, JCF, NCF)
                                                                            SUMDA 57
                                                                            SUMDA 58
      WRITE(ISOUT,1)L,N,XG,YG
                                                                            SUMDA 59
      WRITE (ISOUT, 12)
      DO 59 K=1.KBHX
                                                                            SUMDA 60
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SUMDA 51
   50 WRITE(ISOUT,14) ZCH(K),USUM(K,N,L),VSUM(K,N,L), FZ(K,N,L),
                                                                             SUMDA 52
     1 DXSUM(K,N,L), DYSUM(K, N, L), RSUM(K,N,L)
CALCULATE THE WEIGHTED SUMS OVER ATMOS. STRATA AND REWRITE AKRAYS
                                                                             SUMDA 63
      USUM, VSUM, RSUM, DXSYM: DYSUM. ALSO COMPUTE HDAY AND WAVG.
                                                                             SUMDA 64
                                                                             SUMDA 65
   20 AREA=ICX+JCX^(WINT++2)
                                                                             SUMDA 66
      IF(MC(2) .EQ. 2) WRITE(ISOUT,6)
                                                                             SUMDA 67
      DO 922 L=1.LTIMX
                                                                             SUMDA 68
      DO 1304 LK=1.KBHX
                                                                             SUMDA 69
 1304 WAVG(LK,L) = 0.0
                                                                             SUMDA 70
      HDAV(L) =0.
      DO 921 N=1,NDATX
                                                                             SUMDA 71
      IF(MC(2).NE.2) GO TO 915
                                                                             SUMDA 72
      CALL CNTR(NET, NETSU, N, XG, YG, ICF, JCF, NCF)
                                                                             SUMDA 73
                                                                             SUMDA 74
      WRITE(ISOUT,1)L,N,XG,YG
                                                                             SUMDA 75
      WRITE (ISOUT, 2)
                                                                             SUMDA 76
  915 ZSTEP=ZBH(2)-ZBH(1)
                                                                             SUMDA 77
      USUM(1, N,L) =USUM(1,N,L) *ZSTEP
      VSUM(1,N,L)=VSUM(1,N,L)*ZSTEP
                                                                             SUHDA 78
      RSUM(1, N,L)=RSUM(1,N,L) *ZSTEP
                                                                             SUMDA 79
      DXSUM(1,N,L)=DXSUM(1,N,L)*ZSTEP
                                                                             SUMDA 30
                                                                             SUMD A 81
      DYSUM(1,N,L)=DYSUM(1,N,L)*ZSTEP
                                                                             SUMDA 82
               (DXSUM(1,N,L) + DYSUM(1,N,L))/2.0
                                                                             SUMDA 83
      KBHM1=KBHX-1
                                                                             SUMDA 84
      DO 920 K=2,KBHM1
                                                                             SUMDA 85
      ZSTEP=ZBH(K+1) - ZBH(K)
      USUM(K,N,L)=USUM(K,N,L)*ZSTEP + USUM(K-1,N,L)
                                                                             SUMDA 86
      VSUM(K, N,L) = VSUM(K, N,L) + ZSTEP + VSUM(K-1, N,L)
                                                                             SUMDA 87
      RSUM(K, N, L) = RSUM(K, N, L) + ZSTEP + RSUM(K-1, N, L)
                                                                             SUMDA 88
                                                                             SUMDA 89
      HAV=HAV+(OXSUM(K,N,L) + OYSUM(K,N,L))*ZSTEP/2.0
                                                                             SUMDA 90
      DXSUM(K,N,L)=DXSUM(K,N,L)*ZSTEP + DXSUM(K-1,N,L)
                                                                             SUMDA 91
  920 DYSUM(K,N.L)=DYSUH(K,N.L)*ZSTEP + DYSUM(K-1,N,L)
      HAV = (HAV + (DXSUM(KBHX,N,L)+DYSUM(KBHX,N,L))*(ZMAX-ZBH(KBHX))/2.SUMDA 92
                                                                             SUMDA 93
        )/(ZMAX-ZMIN)
COPY OUT SUMMED DATA IF REQUESTED
                                                                             SUMD A 94
                                                                             SUMDA 95
      IF(MC(2).EQ.2)
     1 \text{ WRITE (ISOUT, } 13) (ZCH (K), USUH (K, N, L), VSUH (K, N, L), DXSUH (K, N, L),
                                                                             SUMDA 96
                                                                              SUMDA 97
     2 DYSUM(K,N,L),RSUM(K,N,L),K=1,KBHX)
                                                                             SUMDA 98
      IF(MC(2) .NE. 1 .ANC. MC(1) .EQ. 1) WRITE(ISOUT, 8)L,N, HAV
                                                                              SUMDA 99
       CALL CNTR(NET, NETSU, N, XG, YG, ICF, JCF, NCF)
                                                                              SUMDA15 C
      XQ=XG
                                                                              SUMDA101
      YQ=YG
                  NEST(NET, NETSU, XQ, YQ, NOATQ, XL, XR, YL, YU, ICF, JCF, NCF)
                                                                              SUMDA112
      CALL
                                                                              SUMDA113
       AREAN= (XR-XL) * (YU-YL)
       HOAV(L) = HOAV(L) + HAV*AFEAN
                                                                              SUMDA114
       00 9210 KL=1,KBHX
                                                                             SUMD A115
 9210 WAVG(KL,L) = WAVG(KL,L) + WFZ(KL,N,L) + AREAN
                                                                              SUMDA116
                                                                              SUMOA1J7
 921
       CONTINUE
                                                                              SUMDA118
       HDAV(L) =HDAV(L)/AREA
                                                                              SUMDA139
       00 9215 KL=1,KB4X
 9215 WAVG(KL,L)=HAVG(KL,L) / AREA
                                                                              SUMDA110
       IF(MC(2) .NE. 1) WRITE(ISOUT,15)L, HDAV(L)
                                                                              SUMDA111
       IF( MC(2) .EQ. 1 .OR. MC(1) .EQ. 0) GO TO 922
                                                                              SUMDA112
                                                                              SUMDA113
       WRITE (ISOUT, 16)
                                                                              SUMDA114
       DO 9922 KL=1, KBHX, 6
                                                                              SUMDA115
       KLP5=KL+5
                                                                              SUMDA116
 9922 WRITE(ISOUT, 17) (K, WAVG(K, L), K=KL, KLP5)
                                                                              SUMDA117
      CONTINUE
                                                                              SUMDA118
       RETURN
                                                                              SUMDA119
       END
```

```
*DECK. TRANP
                                                                             TRANP
      SUBROUTINE TRANP(NET, NETSU, ZBH, TIMUP, USUM, VSUM, DXSUM, DYSUM, RSUF,
                                                                             TRANP
                                                                             TRANP
     1 HFZ, CAVS, TSUM, TMAX, XC, YO, ZO, TO, SIGXO, SIGYO, RO, NCATO,
                                                                                     3
                                                                             TRANP
     2ICF.JCF,NCF,KBHF,NDATF,LTIMF)
C
                                                                              TRANP
                                                                                     5
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                              RANP
                                                                                     6
C
                                                                              IRANP
                                                                                     7
                                                                             *TRANP
                                                                                     8
                                                                             TRANP
                                                                                     q
C
C
      GIVEN COORDINATES AND SETTLING SPEEDS FOR A FALLCUT PARCEL. FLUS ATRANP
C
      TRANSPORT TIME LIMIT, TRANP COMPUTES THE PARCEL COORDINATES AT
                                                                             TRANP
                                                                                    11
                                                                             TRANP
C
      ITS DEPOSITION POINT OR AT THE POINT IT LEAVES THE WIND SPACE OR
      AT THE POINT WHEN IT RUNS OUT OF TIME.
                                                                             TRANP
                                                                                    13
                                                                             TRANP
                                                                             TRANP
C
                                                                                    15
           - COMPUTATION MODE SWITCH
C
                                                                             TRANP
      MODE
                                                                                    16
                  8 RAPID CCHPUTATION (ALL THE WAY TO DEPOSITION USING
                                                                             TRANP
                                                                                    17
                                                                             TRANP
C
                    WEIGHTEC. AVERAGED WINDS)
C
                  1 LAYERWISE COMPUTATION
                                                                             TRANP
C
      TO
            - TIME AFTER PARCEL ADVECTION
                                                                             TRANP
                                                                             TRANP
C
              PARCEL CENTER X COORDINATE AFTER ADDRECTION
      X O
                                                                                    21
              PARCEL CENTER Y COORDINATE AFTER ADVECTION
C
      Yn
                                                                              TRANP
                                                                                    22
C
      70
              PARCEL CENTER Z COORDINATE AFTER ADVECTION
                                                                              TRANP
                                                                                    23
C
              PARCEL DOWNWIND DISPERSION PARAMETER AFTER ADVECTION
                                                                              TRANP
      SIGXO -
C
      SIGYO - PARCEL CROSSIND DISPERSION PARAMETER AFTER ADVECTION
                                                                              TRANP
                                                                                    25
C
      NDATO - INDEX OF HORIZONTAL SPACE RESOLUTION NET MESH
                                                                             TRANP
                                                                                    26
                                                                             TRANP
C
               HIND HEADING ORIENTATION ANGLE AFTER ADVECTION
                                                                                    27
C
                                                                             TRANP
                                                                                    28
C
                                                                             * TRANP
                                                                                    29
                                                                              TRANP
      COMMON /CNTROL/ IPOUT, ISIN, ISOUT, JPARN, MC(20), NSEQO
                                                                              TRANP
       COMMON /INDEX/ ICX, JCX, FBHX, LTIMX, NAT, NCX, NDATX
                                                                              TRANP 32
      COMMON /PARCL/ CROSS, DOWN, DWAF, EDDY, NOATP, PMAS, FSIZ, RHOP, RWAF,
                                                                              TRANP
                                                                                    33
                                                                              TRANP
                                                                                    34
     1 TP, XP, YP, ZLOW, ZP
      COMMON /SPACE/ WINT, XLL C, YLLC, ZMAX, ZMIN, TIMEX
                                                                              TRANP
C
                                                                              TRANP
      DIMENSION NET (ICF, JCF), NETSU (NCF), ZBH(KBHF), USUM (KBHF, NDATF, LTIMF) TRANP
      DIMENSION VSUM(KBHF, ADATF, LTIMF), DXSUM(KBHF, ND ATF, LTIMF)
                                                                              TRANP
                                                                                    38
                                                                              TRANP
                                                                                    39
      DIMENSION DYSUM(KBHF, NDATF, LTIMF), TIMUP(LTIMF), CAVS(KBHF)
      DIMENSION RSUH(KBHF, NDATF, LTIMF), WFZ(KBHF, NDATF, LTIMF), TSUM(KBHF) TRANP
                                                                              TRANF
C
      DATA PROGRM
                     . EPSILO
                                 , EPSZ
                                                                              TRANP
                                            QBRT
         /6HTRANP
                     . .0005
                                   8.1
                                            ..333333333, 1.0E9
                                                                              TRANP
                                                                              TRANP
C
                                                                                    45
    2 FORMAT( 6H TIME=E12.4,
                                5H ALT=E12.4, 7H X-POS=E12.4, 7H Y-POS=E12TRANP
            6H MESH=14, 8F REACHED)
                                                                              TRANP
                                                                                    46
                                5H ALT=E12.4, 7H X-POS=E12.4, 7H Y-POS=E12TRANP
    3 FORMAT( 6H TIME=E12.4.
                                                                                    1.7
            6H MESH=14. 10H ATTEMPTED)
                                                                              TRANP
    4 FORMAT( 1HO, 38HPARCEL AT INITIAL POINT (XP, YP, ZF, TP) 4E12.4/
                                                                              TRANP
                                                                              TRANP
                                                                                    50
     1 31H REQUIRED CHANNELLING AT POINT 4E12.4)
                                                                              TRANP
                                                                                    51
C
      EPS=EPSILO*WINT
                                                                              TRANP
                                                                                    52
                                                                              TRANF 53
      EPST=EPSILO*TMAX
                                                                              TRANP 54
      XQ=XP
      YO=YP
                                                                              TRANP 55
                                                                              TRANP 56
      20=2P
                                                                              TRANP 57
      TO=TP
      SIGXO=0.
                                                                              TRANP
                                                                                    58
      SIGYO=U.
                                                                              TRANP 59
      RO=0.
                                                                              TRANP 60
```

```
NDA TO=NDATP
                                                                           TRANP 61
      NDTC1=0
                                                                           TRANP 62
      NDTO1=0
                                                                           TRANP 63
      KBHC1=0
                                                                           TRANP 64
      KBHO1=0
                                                                           TRANP 65
      LTIM=1
                                                                           TRANP 66
 1000 CONTINUE
                                                                           TRANP 67
      MODE =-1
                                                                           TRANP 68
      IF (MC(4) .NE. 0) MOGE=MODE+1
                                                                           TRANP 69
  50 MODE=MODE+1
                                                                           TRANP 70
      IF(LTIMX.GT.1) CALL CALIB (TIMUP, LTIMX, TO, 1, LTIM)
                                                                           TRANP 71
CLESST ZBH PLANE BELOW ZC. OR EQUAL TO ZO. IS FOUND
                                                                           TRANP 72
      CALL CALIB(ZBH, KBHX, ZO, 1, KBHO)
                                                                           TRANP 73
                                                                           TRANE 74
      IF(ZO~ZBH(KBHO).GT.EPSZ)KBHO=KBHO+1
      WBAR=-CAVS (KBHO-1)
                                                                           TRANP 75
      IF (MCDE.EQ. 0)GO TO 210
                                                                           TRANP 76
CONSIDER TRANSPORT BETWEEN ADJACENT ZBH PLANES
                                                                           TRANP
      WBAR=WBAR+WFZ(KBHO-1,NDATO,LTIM)
                                                                           TRANP 78
      IF(WBAR)206,110,206
                                                                           TRANP 79
      WHEN NET SETTLING SPEED IS ZERO, SET THE TIME INCREMENT TO THE
                                                                           TRANP 80
      TIME LEFT BEFORE THE NEXT UPDATE.
                                                                           TRANP 81
  110 TSEG=TIMEX-TO
                                                                           TRANP 82
      IF(L TIM.LT.LTIMX) TSEG=TIMUP(LTIM+1)-TO
                                                                           TRANP 33
      KBHC=KBHO
                                                                           TRANP 34
      KBHO=KBHC-1
                                                                           TRANP 85
      GO TO 300
                                                                           TRANP 86
CHECK IF KBHO ADJUSTMENT MUST BE MADE BECAUSE PARCEL IS RISING
                                                                           TRANP 67
  206 IF(WBAR.LT.0.0.0.OR.AES(ZO-ZOH(KBHO)).GT.EPSZ)IF(WBAR)210,210,209
                                                                           TRANP 08
      KBH0=KBH0+1
                                                                           TRANP 89
      GO TO 160
                                                                           TRANP 90
CONCLUDE KBHO, KBHC SETTING ! FOR A RISING PARCEL
                                                                           TRANP 91
      KBHO(KBHG) IS THE ZBH PLANE FROM WHICH (TCWARU WHICH) THE PARCEL
                                                                           TRANP 92
C
      IS MOVING.
                                                                           TRANP 93
 209 IF(ZO-ZBH(KBHO).LT.-EPSZ)KBHO=KBHO-1
                                                                           TRANP 94
  210 K3HC=K8H0+IFIX(SIGN(1.0.WBAR))
                                                                           TRANP 95
      TSEG = (ZBH(KBHC)-ZO)/WBAR
                                                                           TRANP 96
       IF (MODE.NE.D .OR. ABS(ZO-ZBH(KBHO)) .GT. EPSZ) GO TO 300
                                                                           TRANF 97
COMPUTE OVERALL SETTLING TIME AND AVERAGE SETTLING SPEED FROM ZO TO ZMINTRANP 98
      TSEG=TSEG+TSUM(KBHC)
                                                                           TRANP 99
      WBAR=(ZMIN-ZO)/TSEG
                                                                           TRANP100
      KBHC=1
                                                                           TRANP101
      TC=TO+TSEG
                                                                           TRANP102
CHECK IF A TIME BOUNDARY IS CROSSED
                                                                           TRANP133
      IF(LTIM .EQ. LTIMX) IF(TIMEX-TC)301,351,350
                                                                           TRANP114
      IF(TIMUP(LTIM+1) - TC) 305,350,350
                                                                           TRANP105
CHANGE PARAMETERS TO LIMIT TRANSPORT TO OR LESS THAN THE TIME BOUNDARY
                                                                           TRANF106
  301 TSEG=TIMEX-TO
                                                                           TRANP117
      TLIM=TIMEX
                                                                           TRANP138
      GO TO 306
                                                                           TRANP119
  305 TSEG = TIMUP(LTIM+1)-TO
                                                                           TRANP110
      TLIM=TIMUP(LTIM+1)
                                                                           TRANP111
  306 IF(MCDE .GT. 0 .OR. KBHO-KBHC .EQ.1) GC TO 350
                                                                           TRANP112
      CALL CALIB(TSUM, KBHX, TC-TLIM, -1, KBHC)
                                                                           TRANP113
      IF(KBHO .GT. KBHC) GC TO 310
                                                                           TRANP114
      KBHC=KBHC-1
                                                                           TRANF115
      WBAR = -CAVS (KUHC)
                                                                           TRANP116
      GO TO 357
                                                                           TRANP117
                                                                           TRANP118
  310 TSEG = TSUM(KBHO) - TSUM(KBHC)
      WBAR= (ZBH(KBHC)-ZO)/TSEG
                                                                           TRANP119
COMPUTE AVERAGE HORIZONTAL VELOCITIES UBAR AND VBAR
                                                                           TRANP120
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TRANP121
 350 KBHA=KBHO
      KBHB=KBHC
                                                                              TRANP122
      IF(WBAR.LT.0.0) GO TO 405
                                                                              TRANP123
                                                                              TRANP124
      KBHA=KBHC
                                                                              TRANP125
      KRH8=KRH0
  405 CALL GETDA ( USUM, ZBH, KBHA, KBHB, NDATO, LTIM, UBAR, KBHF, NDATF, LTIMF) TRANP126
      CALL GETDA ( VSUM, ZBH, KBHA, KBHB, NDATO, LTIM, VBAR, KBHF, NDATF, LTIMF) TRANP127
  407 CONTINUE
                                                                              TRANP128
COMPUTE AVERAGE HORIZONTAL DISPERSION AND WIND ORIENTATION ANGLE
                                                                              TRANF129
      CALL GETDA (DXSUM, ZBH, KBHA, KBHB, NDATO, LTIM, DXBAR, K9HF, NDATF, LTIMF) TRANP130
      CALL GETDA (DYSUM, Z8H, KBHA, KBHB, NDATO, LTIM, DYBAR, KBHF, NDATF, LTIMF) TRANP131
      CALL GETDA ( RSUM, ZBH, KBHA, KBHB, NDATO, LTIM, RBAR, KBHF, NDATF, LTIMF)
                                                                              TRANP132
      RC=RO+RBAR
                                                                              TRANP133
      SIGXC=SIGXO+DXBAR*TSEG
                                                                              TRANP134
      SIGYC=SIGYO+DYBAR*TS EG
                                                                              TRANP135
COMPUTE CURRENT POSITION AND TIME (XC, YC, ZC, TC)
                                                                              TRANP136
      TC=TO+TSEG
                                                                              TRANP137
      ZC=ZO+WBAR*TSEG
                                                                              TRANP138
      XC=XO+UBAR*TSEG
                                                                              TRANP139
      YC=YO+VBAR+TSEG
                                                                              TRANF140
                                                                              TRANP141
      CALL NESTINET, NETSU, XC, YC, N DATC, XL, XR, YL, YU, ICF, JCF, NCF)
      IF(MC(5).EQ.1) WRITE(ISOUT, 3) TC, ZC, XC, YC, NDATC
                                                                              TRANP142
COMPARE CURRENT MESH INDEX NDATC WITH PREVIOUS MESH INDEX NDATO
                                                                              TRANP143
      IF (NDATC.EQ.NDATO) GC TO 700
                                                                              TRANP144
      IF (MODE.EQ.0) GO TO 50
                                                                              TRANP145
COMPUTE INTERPOLATED POINT
                                                                              TRANP146
      XT = XC
                                                                              TRANP147
      YT=YC
                                                                              TRANP148
      ZT=ZC
                                                                              TRANP149
      CALL BOUN (NET, NETSU, XT, Y 1, XO, YO, XC, YC, IGF, JCF, NCF)
                                                                              TRANP150
      ZC=SQRT(((XT-XC)++2+(YT-YC)++2)/((XT-XO)++2+(YT-YO)++2))
                                                                              TRANP151
      ZC = ZT + ZC * (ZO - ZT)
                                                                              TRANP152
      IF(ABS(WBAR).LE.1.0E-30) GO TO 510
                                                                              TRANP153
      TSEG=(ZC.ZO)/WBAR
                                                                              TRANP154
                                                                              TRANP155
      GO TO 518
     IF(ABS(UBAR).LE.1.0E-30) GO TO 513
                                                                              TRANP156
      TSEG=(XC-XO)/UBAR
                                                                              TRANP157
      GO TO 518
                                                                              TRANP158
      IF (ABS(V8AR) LE. 1. DE-33) GO TO 516
                                                                              TRANP159
      TSEG=(YC-YO)/VBAR
                                                                              TRANP160
      GO TO 518
                                                                              TRANP161
      CALL ERROR (PROGRM, 516, IS CUT)
 516
                                                                              TRANP162
      RETURN
                                                                              TRANP163
  518 CONTINUE
                                                                              TRANP164
      RC=RO+RBAR
                                                                              TRANP165
      SIGXG=SIGXO+0XBAR+TSEG
                                                                              TRANP166
      SIGYC=SIGYO+DYBAR*TSEG
                                                                              TRANP167
      TC=TO+TSEG
                                                                              TRANP168
      CALL NEST(NET, INETSU, XC, YC, NDA) C, XL, XR, YL, YU, ICF, JCF, NCF)
                                                                              TRANF169
CHECK IF PARCEL CENTER POSITION IS OSCILLATING
                                                                              TRANP170
      IF ((KBH01.NE.KBH0).CR.(KBHC1.NE.K3HC).OR.(NDTC1.NE.NDATC).OR.
                                                                              TRANP171
     1 (NDT01. NE. NDAT0)) GO TO 626
                                                                              TRANP172
      IF(MC(5).EQ.1) WRITE(ISOUT,4) XP,YP,ZP,TF,XC,YC,ZC,TC
                                                                              TRANP173
      CALL CNTR(NET, NETSU, NDATO, XG, YG, ICF, JCF, NCF)
                                                                              TRANP174
      XQ = XG
                                                                              TRANP175
      YQ=YG
                                                                              TRANP176
      CALL NEST(NET, NETSU, XG, YQ, NDATQ, XLO, XRO, YLO, YUO, ICF, JCF, NCF)
                                                                              TRANP177
CLEAR STORED MESH AND STRATUM INDICES
                                                                              TRANP178
      NDTC1=0
                                                                              TRANP179
      NDT 01 = 0
                                                                              TRANP190
```

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KaHC1=0
                                                                           TRANP181
      K8H01=0
                                                                           TRANP132
CHANNEL WAFER CENTER POSITION ALONG APPRPRIATE CELL BOUNDARY
                                                                           TRANP193
                                                                           TRANP18+
      SPE=2.*EPS
      IF((Abs(xLo-xR).GT.SPE).AND.(AB?(xRO-xL).GT.SPE)) GO TO 616
                                                                           TRANP185
      UBAR=0.
                                                                           TRANP186
      CALL GETOA( VSUM, ZBH, KBHA, KBHB, NCA (O, LTIM, VBARC, KBHF, NDA TF, LTIMF) TRAN2137
      IF (ABSIVBARC). LE. ABS(YBAF)) GO TO 407
                                                                           TRANP185
      V3AR=VBARC
                                                                           TRANP189
                                                                           TRANP130
      NDA TO=NDATC
                                                                           TRANP191
      GO TO 407
 616 IF((ABS(YLO-YU).GT.SPE).AND.(ABS(YUO-YL).GT.SPE))
                                                                           TRANP192
     1 CALL ERROR (PROGRM. 616. ISOUT)
                                                                           TRANP193
      VBAR=C.
                                                                            TRANP134
      CALL GETOA ( USUM, ZBF, KBHA, KBHB, NDATO, LTIM, UBARC, KMHF, NDATF, LTIMF) TRANP135
                                                                           TRANP196
      IF (ABS (UBARC) . LE. ABS (UBAR) ) GO TO 407
                                                                           TRANP197
      UBAR=UBARC
      STACK=OTACK
                                                                            TRANP198
                                                                           TRANP139
      GO TO 407
COMMIT PREVIOUS #5
                     TURRENT MESH AND STRATUM INDICES TO STORAGE
                                                                            TRANP200
 626 NOT C1 = NOAT
                                                                           TRANP201
      NDT01=NUATC
                                                                           TRANP2J2
                                                                           TRANP213
      K8HC1=KBHC
      KBH01=KBH0
                                                                           TRANP2J4
CONVERT X0, Y0, Z0, T0, SIGXO, SIGYO, AND NDATO YO CURRENT VALUES
                                                                            TRANP235
 700 ZO= ZC
                                                                            TRANP216
                                                                            TRANP207
      XS-XC
                                                                            TRANP218
      YO=YC
                                                                           TRANP219
      TU=TC
      NDATO=NDATC
                                                                            TRANP210
      IF(MC(5) EQ.1) WRITE(ISOUT,2) TO, ZO, XO, YO, NDATO
                                                                           TRANP211
      SIGXO=SIGXC
                                                                            TRANP212
      SIGYO=SIGYO
                                                                            TRANP213
      RO=RC
                                                                            TRANP214
                                                                            TRANP215
CHECK IF CURRENT POSITION IS OUTSIDE ATMOSPHERE
                                                                            TRANP216
      IF(NDATO, LE.0) GO TC 720
      IF DEPOSITION PLANE IS REACHED OR TRANSPORT TIME LIMIT IS EXCEEDED TRANP217
C
      EXIT FROM TRANP, OTHERWISE RETURN TO TOP
                                                                            TRANP218
                                          (TIMEX-TO) LE.EPST)) GO TO 728
      IF ((
               (ZO-ZMIN).LE.EPSZ).OR.(
                                                                           TRANP219
      GO TO 1800
                                                                            TRANP220
COMPUTE HORIZ. DISPERSION
                                                                            TRANP221
  720 R2=RWAF++2
                                                                            TRANP222
      TRIP=TO-TP
                                                                            TRANP223
                                                                            TRANP224
      DSPRTX=SIGXO/TRIP
      SIGXO = ( R2**QBRT + 2.0 * DOWN * TRIP * DSPRTX**QBRT/3.0 ) ** 3
                                                                           TRANF225
                      VARL ) SIGXO = VARL * ( 2.0 * 00%N * TRIP *
                                                                            TRANP226
      IF( SIGXO .GT.
        ( DSPRTX/ VARL ) PAGBRT + 3.0 + 1 R2/ VARL ) **QBRT - 2.0 )
                                                                            TRANP227
      SIGXO = SQRT( SIGXO )
                                                                            TRANF228
                                                                            TRANP229
      DSPRTY = SIGYO/TRIF
      SIGYO = ( R2**QBRT + 2.0 * CROSS * TRIP * DSPRTY**QBRT/3.0 ) ** 3 TRANP230
                      WARL ) SIGYO = WARL * ( 2.9 * CRCSS * TRIP *
                                                                            TRANP231
      IF( SIGYO .GT.
        ( OSPRTY/ WARL ) ** GBRT + 3.0 * ( R2/ VARL ) ** QBRT - 2.3 )
                                                                            TRANP232
                                                                            TRANP233
      SIGYO = SQRT( SIGYO )
      PETURN
                                                                            TRANP234
                                                                            TRANF235
      END
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And the state of the second of

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TRIDI
*DECK, TRIDIN
                                                     , VZ , LTIM, IGF, JCF, NCF,
                                                                             TRIDI
      SUBROUTINE TRIDIN(NET.NETSU, ZCH, VX
                                                                              TRIDI
     1 KBHF, NDATF, LTIMF, FCRM, SPEC)
                                                                              TRIDI
                                                                              TRIDI
      H. G. NORMENT. ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
C
                                                                              TRIDI
                                                                             TRIDI
                                                                              TRIDI
                                                                                     9
      THIS SUBROUTINE FORMS A HORIZONTALLY AND VERTICALLY VARIANT WIND
                                                                              TRIDI
C
                                                                              TRIDI 10
                                INPUTS ARE -
C
      OR TURBULENCE FIELD.
                  A HEIGHTING FACTOR FOR THE VERTICAL DISTANCES
                                                                              TRIDI
      ALPHA
C
                                                                              TRIDI 12
                  A HEIGHTING FACTOR FOR THE HORIZONTAL DISTANCES
C
      BETA
                                                                              TRIDI 13
                  OBJECT TIPE FCRMAT
C
      FMT
                  THE NUMBER OF NEAREST DATA VECTORS THAT THE USER WISHESTRIDI
Ċ
      NN
                  TO BE USEC IN COMPUTATIONS
                                                                              TRIDI
                                                                                    15
                                                                              TRIDI 16
C
                  INPUT DATA POINTERS
      N1, N2, ETC
                  FACTORS USED TO TRANSLATE AND SCALE THE INPUT DATA
                                                                              TRIDI 17
C
      SCALE
                                                                              TRIDI 18
                  HEIGHT OF THE J-TH VRCTOR
C
      ZS(J)
                  WEST-EAST COORDINATE OF THE J-TH VECTOR
                                                                              TRIDI 19
C
      XS(J)
                  SOUTH-NORTH COORDINATE OF THE J-TH VECTOR
                                                                              TRIDI 20
      YS(J)
                                                                              TRIDI 21
                  EASTWARD FOINTING COMPONENT OF THE J-TH VECTOR
      SX(J)
                                                                              TRIDI 22
                  NORTHWARD POINTING COMPONENT OF THE J-TH VECTOR
C
      SY(J)
                  UPWARD POINTING COMPONENT OF THE J-TH VECTOR
                                                                              TRIDI
                                                                                    23
      SZ(J)
                                                                              ICIST
                                                                                     24
      THE VECTOR READING OPERATION IS TERMINATED WHEN ZS(J).GE.999999.
                                                                              TRIDI
                                                                                     25
                                                                             *TRIDI
           ***************** OTHER PARAMETERS *******
                                                                                    26
                                                                              TRIDI 27
                                                                              TRIDI 28
                  AN ARBITRARILY LARGE NUMBER
C
      BIG
                  DISTANCE EETHEEN THE CURRENT GRID PCINT AND THE MOST
                                                                              TRIDI 29
      MO
                                                                              TRIDI 30
                   REMOTE OF THE NEAREST NN DATA POINTS
C
                   AN ARBITRARILY SMALL NUMBER
                                                                              TRIDI 31
C
      GIB
                   THE TOTAL NUMBER OF WIND DATA POINTS BEING USED
                                                                              TRIDI 32
      JTOPV
                                                                              TRIDI
                   INDICES OF DISTANCES BETWEEN THE CURRENT GRID POINT
      NAD (J)
                                                                              TRIDI
                                                                                     34
                   AND THE JTH DATA POINT
C
                   INDEX OF THE NAD THAT CONTAINS THE ACCRESS OF THE D2
                                                                              TRIDI
                                                                                     35
      TOAM
                                                                              TRIDI
                                                                                     36
                   WHICH IS THE LARGEST OF NEAREST NN DATA POINTS
                                OF A SPACE LATTICE CENTER POINT
                                                                              TRIDI
                                                                                     37
                                                                              TRIDI
                                                                                     38
                                                                              FRIDI 39
                                                                              TRIDI +0
                                                                              TRIDI 41
       COMMON /CNTROL/ IPOUT, ISIN, ISOUT, JPARN, MC(20), NSEQO
                                                                              TRIDI 42
        COMMON /INDEX/ ICX, JCX, KBHX, LTIMX, NAT, NCX, NOATX
                                                                              TRIDI 43
C
                                                                              TRIDI
       INTEGER WIND, TURB, ME TEOR, RESOLV, SPEC, FORM
                                                                              TRIDI
                                                                                     45
       DIMENSION ZCH(KBHF), NET(ICF, JCF), NETSU(NCF), VX (KBHF, NDATF, LTIMF)
                                                                               ICIST
                                                                                     46
       DIMENSION VY(KBHF, NCATF, LTIMF), VZ(KBHF, NDATF, LTIMF)
       DIMENSION XS(200), YS(200), ZS(200), SX(200), SY(200), SZ(200)
                                                                               TRIDI
                                                                               TRIDI
                                                                                     48
       DIMENSION D2(200), NAC(200), SCALE( 8), AP(6), FMT (12)
                                                                               TRIDI
                                                                                     49
C
            ALIMIT , RADC , PROGRM , METECR , RESCLV, HIND , TURB TRIDI 999999 .. 0174532925, 6HTRIDIN, 4HMETE ,4HRESO,4HNIND,4HTUR3/TRIDI
                                                                                     50
                                                                               TRIDI 52
             JYOPF , BIG
                               , CIB
       DATA
                                                                               TRIDI 53
             / 200 ,1.0E+37 s 1.0E-37 /
                                                                               TRIDI 54
      FORMAT(/18X, 5HALPHA, 8X, 4HBETA, 14X, 2HNN/ 15X, 2E12.4, T12)
                                                                               TRIDI 55
                                                                               TRIDI 56
     3 FORMAT(8X, 18, 6E16.4)
      FORMATIST, 62HTHE DATA VECTOR AT EACH SPACE LATTICE CENTER IS CONTRIDI
                                                                                     57
      1PUTED USINGIA. 7H OUT OFIA, 15H INPUT VECTORS./)
                                                                               TRIGI
                                                                                     58
                                                                               TRIOI 59
       FORMAT(2014)
                                                                               TRIDI 60
    10 FORMAT(8F10.0)
```

```
11 FORMAT(12A6)
                                                                            TRIDI 61
      FORMAT(2F10.0, I4)
                                                                            TRIDI 62
   20 FORMAT( //53X, 22HSCALED WIND DATA
                                                / 11X, 5HINDEX, 11X,
                                                                            TRIDI 63
     1 1HZ, 15X, 1HX, 15X, 1HY, 14X, 2HVX, 14X 2HVY, 14X, 2HVZ)
                                                                            TRIDI 64
   21 FORMAT( //50X, 22HSCALED TURBULENCE DATA/ 11X, 5HINDEX, 11X,
                                                                            TRIDI 65
     1 1HZ, 15X, 1HX, 15X, 1HY, 12X, 4HEPSX, 10X, 4HEPSY) TRIDI 66
FORMAT(// 78H NO VECTORS LIE WITHIN THE SPECIFIEC WEIGHTING REGIONTRIDI 67
         A RANDOM SELECTION OF . 14, 30H VECTORS ARE EQUALLY WEIGHTED .
                                                                            TRIDI 68
                                                                            TRIDI 69
     2/ 5X, 15H FOR GRID PCINT,
           5X, 9H(X,Y,Z)=(, F12.3,1H,,F12.3,1H,,F12.3,1H))
                                                                            TRIDI 70
   31 FORMAT( //50x, 22H RAW WIND DATA / 11X, 5HINDEX, 11X,
                                                                            TRIDI 71
     1 1HZ, 15X, 1HX, 15X, 1HY, 10X, 10HVX OR CIR., 6X, 11HVY OR SPEED, TRIDI 72
     2 9X, 2HVZ)
                                                                            TRIDI 73
   32 FORMAT( //47X, 22H
                            RAW TURBULENCE DATA/ 11X, 5HINDEX, 11X,
                                                                             TRIDI 74
     1 1HZ, 15X, 1HX, 15X, 1HY, 12X, 4HEPSX, 10X, 4HEPSY)
                                                                             TRIDI 75
   33 FORMAT(8X,18,5E16.4)
                                                                            TRIDI 76
                                                                             TRICI 77
                                                                           **TRIDI 78
C
                                                                            TRIDI 79
COPY IN CONTROL PARAMETERS
                                                                             TRIDI 80
      READ(ISIN, 17) ALPHA, BETA, NN
                                                                             TRIDI 81
      ALFA2=ALPHA**2
                                                                             TRIDI 82
      BETA2=BETA++2
                                                                             TRIDI 83
      IF(NN . EQ. 0) NN=1
                                                                             TRIDI 84
                                                                             TRIDI 85
      READ(ISIN, 11) FMT
      READ(ISIN, 10) SCALE
                                                                            TRIDI 86
                                                                            TRIDI 87
      DO 9 I=1.3
   9 IF( SCALE(I) .EQ. 0.( ) SCALE(I) = 1.0
                                                                             IRIDI 38
      IF( SCALE( 6).EQ. 0.0 ) SCALE( 6) = 1.0
                                                                             TRIDI 89
      WRITE(ISOUT,1) ALPHA, BETA, NN
                                                                             TRIDI 90
                                                                             TRIDI 91
      READ(ISIN, 8) N1, N2, N3, N4, N5, N6
   13 IF(N1+N2+N3+N4+N5+N6 .LT. 21) CALL ERROR(PROGRM,-13, ISOUT)
                                                                             TRIDI 92
      IF( FORM .EQ. METEOR) TRNS = SCALE(5)*SCALE(3) - 180.
                                                                             TRIDI 93
      IF(MC(2) .NE. 1 .AND. SPEC .EQ. WIND) WRITE(ISCUT, 31)
                                                                             TRIDI 94
                                                                             TRIDI 95
      IF(MC(2) .NE. 1 .ANC.
                              SPEC .EQ. TURB) WRITE(ISCUT, 32)
                                                                             TRIDI 36
      0 = 0
COPY IN ATMOSPHERE DATA VECTORS
                                                                             TRIDI 97
  100 READ(ISIN, FMT) AP
                                                                             TRIDI 98
                                                                             TR10I 99
      IF(AP.(N1).GE. ALIMIT) GO TO 101
                                                                             TRIDI1J0
      J=J+1
COPY OUT RAW DATA
                                                                             TRIDI101
      IF(MC(2) .NE. 1 .ANC. SPEC .EQ. WIND) WRITE(ISCUT, 3)J,AP(N1),
                                                                             TRIDI102
     1 AP(N5), AP(N6), AP(N2), AP(N3), AP(N4)
                                                                             TRIDI1:3
      IF(MC(2) .NE. 1 .ANC. SPEC .EQ. TURB) WRITE(ISCUT,33)J,AP(N1),
                                                                             TRIDI1J4
     1 AP(N5), AP(N6), AP(N2), AP(N3)
                                                                             TRIDI115
      IF(J.GT.JTOPF) CALL ERROR(PROGRM,-100, ISCUT)
                                                                             TRIDI106
      7S(J) = (AP(N1) + SCALE(4)) *SCALE(1)
                                                                             TRIDI137
      XS(J) = (AP(N5) + SCALE(7))*SCALE(6)
                                                                             TRIDI198
      YS(J) = (AP(N6) + SCALE(8))*SCALE(6)
                                                                             TRIDI109
      SZ(J) = AP(N4) * SCALE(2)
                                                                             TRIDI110
      IF( FORM .EQ. RESOLV .OR.
                                    SPEC .EQ. TURB ) GO TO 50
                                                                             TRIDI111
      SX(J) = AP(N3) + SCALE(2) + SIN(RACC+(AP(N2) + SCALE(3) + TRNS))
                                                                             TRIDI112
      SY(J) = AP(NT)*SCALE(2) * COS(RADC*(AP(N2)*SCALE(3) * TRNS))
                                                                             TRIDI113
      GO TO 100
                                                                             TRIDI114
   50 SX(J) = AP(N2) + SCALE(2)
                                                                             TRIDI115
      SY(J) = AP(N3) + SCALE(2)
                                                                             TRIDI116
      GO TO 100
                                                                             TRIDI117
  101 JTOPV=J
                                                                             TRID1118
      IF(4C(2).EQ.1) GO TO 102
                                                                             TRIDI119
COPY OUT SCALED INPUT DATA
                                                                             14101150
```

```
IF(SPEC .EQ. WIND) WRITE( ISOUT.20)
                                                                           TR101121
      IF(SPEC .EQ. TURB) WRITE( ISOUT, 21)
                                                                           TRIDI122
      IF(SPEC .EQ. HIND)HRITE(ISOUT, 3)(J,ZS(J),XS(J),YS(J),SX(J),SY(J),TRIDI123
     1 SZ(J), J=1, JTOPV)
                                                                           TRIDI124
      IF(SPEC .EQ. TURB) WRITE(ISOUT,33)(J,ZS(J),XS(J),YS(J),SX(J),SY(J) TRIDI125
     1 .J=1.JTOPV)
                                                                           TRIDI126
  102 IF(NN.GT.JTOPV .OR. NN.LT. 0) NN=JTOPV
                                                                           TRIDI127
  115 IF(NN.LT.1) CALL ERRCR(PROGRM,-115, ISOUT)
                                                                           TRIDI128
      WRITE (ISOUT, 4) NN, JTOFV
                                                                           TRIDI129
COMMENCE CALCULATION OF DATA VECTOR AT EACH SPACE LATTICE CENTER POINT
                                                                           TRIDI130
      USING NN NEAREST INPUT VECTORS
                                                                           TRIDI131
      NN1 = NN + 1
                                                                           TRIDI132
COMMENCE LOOP ON LATTICE CENTER POINTS IN THE HORIZONTAL PLANE.
                                                                           TRIDI133
      DO 906 NDATA=1,NDATX
                                                                           TRIDI134
      CALL CNTR(NET.NETSU, NDATA, XG, YG, ICF, JCF, NCF)
                                                                           TRIDI135
COMMENCE LOOP ON ATMOSPHERIC STRATA.
                                                                           TRIDI136
      DO 905 KBH=1.KBHX
                                                                           TRIDI137
      ZG=ZCH(KBH)
                                                                           TRIDI138
      DO 213 J=1,JTOPV
                                                                           TRIDI139
C
                                                                           TRIDI140
      SET ALL NAD(J) EQUAL TO J TO PROVIDE INDICES FOR THE FULL SET OF
C
                                                                           TRIDI141
C
      DATA POINTS AND TO PROVIDE AN INITIAL SET OF -NEAREST- DATA FOINTSTRIDI142
      L=(L) DAM
                                                                           TR101143
C
                                                                           TRIDI144
C
                                                                           TRIDI145
      COMPUTE DISTANCES BETWEEN THE CURRENT LATTICE CENTER POINT
C
      (XG,YG,ZG) AND EACH OF THE INPUT DATA VECTOR LOCATIONS.
                                                                           TRIDI146
      EACH OF THE DATA VECTOR LOCATIONS
                                                                           TRIDI147
      TX=XS(J)-XG
                                                                           TRIDI148
      TY= YS (J) -YG
                                                                           TRIDI149
      TZ=ZS(J)-ZG
                                                                           TRIDI150
      CRESSZ=TZ4T7
                                                                           TRIDI151
      CUTOFF=ALFA2-CRESSZ
                                                                           TRI01152
      IF(CUTOFF.LE.0) GO TO 202
                                                                           TRIDI153
      CRESSZ=CUTOFF/(ALFA2+CRESSZ)
                                                                           TRIDI154
      CRESSR=TX*TX+TY*TY
                                                                           TRIDI155
      CUTOFF=BETA2-CRESSR
                                                                           TRIDI156
      IF(CUTOFF.LE.D) GO TO 202
                                                                           TRIDI157
      CRESSR=CUTOFF/(BETA2+CRESSR)
                                                                           TRIDI158
      CRESSZ=CRESSZ*CRESSR
                                                                           TRIDI159
      IF (CRESS?.LE.GIB) GC TO 202
                                                                           TRIDI160
      D2(J)=1.0/CRESSZ
                                                                           TRIDI161
      GO TO 203
                                                                           TRIDI162
  202 D2(J)=BIG
                                                                           TR101163
 203
     CONTINUE
                                                                           TRIDI164
C
                                                                           TRIDI165
C
      SET NADT=1 TO BEGIN THE SORT PROCEDURE THAT SELECTS THE MOST
                                                                           TRIDI166
C
      REMOTE OF THE SET OF -NEAREST- DATA POINTS. NOTE THAT FOR THE 1STTRIDI167
      PASS ALL THE NN -NEAREST- POINTS ARE EQUALLY LIKELY TO BE THE MOSTTRIDI168
      REMOTE OF THE SET.
C
                                                                           TRIDI169
      NADT=1
                                                                           TRIDI170
C
                                                                           TRIDI171
      FIND THE ADDRESS OF AND DISTANCE TO THE MOST REMOTE POINT OF THE
C
                                                                           TRIDI172
      NN -NEAREST- POINTS (THE POINTS WHOSE ADDRESSES ARE GIVEN BY
                                                                           TR101173
С
      NAD(1), NAD(NN).) STORE THAT MAXIMUM DISTANCE IN THE WORD DM AND
                                                                           TRIDI174
      SET NADT SUCH THAT DE=D2(NAD(NADT)).
                                                                           TRIDI175
      KL=NAD(NADT)
                                                                           TRIDI176
      DM=D2(KL)
                                                                           TRIDI177
      DO 207 J=1,NN
                                                                           TRIDI178
      KL=NAD(J)
                                                                           TRIDI179
      IF(DM-02(KL))208,207,207
                                                                           TRIDI180
```

```
208
      DM=D2(KL)
                                                                           TRIDI181
      NADT=J
                                                                           TRIDI182
 207
      CONTINUE
                                                                           TRIDI183
C
      AT THIS POINT, DM IS THE LARGEST D2(J) FCR J=NAD(J),NAD(NN)
                                                                           TRIDI154
                                                                           TRIDI185
C
      IF (NN1-JTOPV) 2072, 2072, 2073
                                                                           TRIDI186
                                                                           TRIDI187
C2072 NOW SELECT DEST NN POINTS
                                                                           TRIDI108
      SCAN THE SET D2(J), J=NAD(NN+1, JTOPV) UNTIL A D2(J) LESS THAN DM
                                                                           TRIDI189
      IS FOUND. IF ONE IS FOUND, SWITCH NAD (NADT) WITH THE SELECTED NADTRIDI190
C
C
      THEN RESET DM AND NACT TO INDICATE THE MCST KENCTE OF THE NEAREST TRIDI191
      NN POINTS. WHEN THE FULL SET D2(J), J=NAC(NN+1, JTOPV) HAS BEEN
                                                                           TRI01192
      SCANNED, THE SET OF NEAREST DATA POINTS HAS BEEN SELECTED. ONLY
                                                                           TRIDI193
                                                                           TRIDI194
      ONE SCAN IS REQUIRED.
 2072 DO 210 J=NN1, JTOPV
                                                                           TRIDI195
      KL=NAD(J)
                                                                           TRIDI136
      IF(DM-D2(KL))210,210,211
                                                                           TRIDI197
      NTEMP=NAD(J)
                                                                           TRIDI198
      NAD(J) = NAD(NADT)
                                                                           TRIDI199
      NAD (NADT) = NTEMP
                                                                           TRIDI200
                                                                           TRIDI201
      NOW RESET DM AND NADT TO THE NEW MOST REMOTE POINT
                                                                           TRIDI202
      DM=D2(KL)
                                                                           TRIDI203
      DO 212 KKK=1.NN
                                                                           TRIDI214
      KL=NAD(KKK)
                                                                           TR101215
      IF(DM-02(KL))213,212,212
                                                                           TRIDI236
     DM=D2(KL)
                                                                           TRIDI237
      NADT=KKK
                                                                            TRIDI218
C
                                                                            TRIDI2J9
      DM AND NAOT ARE SET WITH THE PARAMETERS OF THE MCST REMOTE OF
C
                                                                            TRI01210
      THE NEAREST NN POINTS
                                                                            TRIDI211
 212
      CONTINUE
                                                                            TRIDI 212
 210
      CONTINUE
                                                                            TRIDI213
 2073 CONTINUE
                                                                           TRIDI214
                                                                           TRIDI215
      THE NEAREST NN HAVE BEEN FOUND
                                                                            TRIDI216
C
C
                                                                           TRIDI217
                                                                           TRID1218
C2080 COMPUTE AND SUM THE WEIGHTING FACTORS
                                                                            TRIDI219
 2080 SUM=0.0
                                                                           TRIDI220
                                                                            TR101221
      DO 214 J=1,NN
                                                                           TRIDIZZZ
      L=NAD(J)
      52(L)=1.0/D2(L)
                                                                            TRIDI223
      SU4=SUM+D2(L)
                                                                            TRIDI224
      IF(SUM/FLOAT(NN) .LE. GIB) WRITE(ISOUT, 24) NN, XG, YG, ZG
                                                                            TRIDI225
                                                                            TRIDI226
      NOW COMPUTE VECTOR ESTIMATE AT LATTICE CENTER POINT.
                                                                            TRIDI 227
      COMPUTE STORAGE INCEX
                                                                            TRIDI228
      COMPUTE AND STORE VECTOR ESTIMATE AT LATTICE CENTER POINT.
                                                                            TRIDI229
      VXKNL=0.0
                                                                            TRID1230
      VYKNL=0.0
                                                                            TRIDI231
                                                                            TR101232
      VZKNL=0.J
      DO 216 J=1, NN
                                                                            TRIDI233
      L=NAD(J)
                                                                            TRIDI234
      VXKNL=VXKNL+SX(L)*D2(L)
                                                                            TRIOI 235
      VYKNL=VYKNL+SY(L)*D2(L)
                                                                            TRIDI236
      VZKNL=VZKNL+SZ(L)*D2(L)
                                                                            TRIDI237
                                                                            TRIDI238
      VXKNL=VXKNL/SUM
                                                                            TRID1239
      VYKNL=VYKNL/SUM
                                                                            TRIDI240
      VZKNL=VZKNL/SUN
```

```
IF(FORM .EQ. TURB) GO TO 905
      VZ(KBH, NOATA, LTIM) = VZKNL
                                                                        TRIDI244
905
     CONTINUE
                                                                        TRIDI245
 906
    CONTINUE
                                                                        TRIDI246
     RETURN
                                                                        TRIDI247
                                                                        TRIDI248
     END
*DECK, WILKNS
                                                                        WILKN
     SUBROUTINE WILKNS (ZCH, DXSUM, DYSUM, CAVS, TIMUP, KBHF, NDATF, LTIMF, L) WILKN
                                                                        WILKN
      H. G. NORMENT. ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                        HILKN
                                                                        WILKN
  HILKN
  WILKINS FUNCTION (JAS 20, 473(1963)) IN THE FCRM BELOW IS USED TO
                                                                        WILKN
   COMPUTE TURBULENT KINETIC ENERGY DENSITY DISSIPATION RATE, EPS,
                                                                        WILKN
                                                                               9
                                                                        WILKN 10
C
     EPS=USTAR**3 / (0.25*(Z+Z0))
                                                                        WILKN 11
                                                                        WILKN 12
C
   WHERE -
                                                                        WILKN 13
     USTAR IS SURFACE LAYER FRICTION VELOCITY
                                                                        WILKN 14
            IS SURFACE RCUGHNESS LENGTH
                                                                        HILKN 15
      ΖQ
                                                                        WILKN 16
            IS ALTITUDE ABOVE GZ.
                                                                        WILKN 17
  USTAR IS COMPUTED FROM SURFACE WIND SPEED (U), HEIGHT AT WHICH U IS
                                                                        WILKN 18
   MEASURED (ZM, USUALLY ZF=10 METERS), ROUGHNESS LENGTH (ZO), AND
                                                                        WILKN 19
   RECIPROCAL MONIN-OBUKHOV LENGTH (RL), VIA THE EQUATION
                                                                        WILKN 20
                                                                        WILKN 21
      USTAR=0.35*U / (ALCG(ZM/Z0)+CHI)
                                                                        WILKN 22
C
                                                                        WILKN 23
  WHERE CHI IS CALCULATED BY EXPRESSIONS GIVEN BY BARKER AND BAXTER,
                                                                        WILKN 24
                                                                        WILKN 25
   JAS 14, 620(1975).
                                                                        WILKN 26
   IF U, ZM, ZO, AND RL ARE NOT INPUT, THE EQUATION
                                                                        WILKN 27
                                                                        WILKN 28
                                                                        WILKN 29
C
      EPS=0.03/Z
                     (M**2/SEC**3)
                                                                        WILKN 30
                                                                        WILKN 31
   IS USED.
                                                                        WILKN 32
                                                                       *WILKN 33
С
                                                                        WILKN 34
C
      COMMON /CNTRCL/ IPOLT, ISIN, ISOUT, JPARN, MC(20), NSEQO
                                                                        WILKN 35
       COMMON /INDEX/ ICX, JCX, KBHX, LTIPX, NAT, NCX, NDATX
                                                                        WILKN 36
      COMMON /SPACE/ WINT, XLLC, YLLC, ZMAX, ZMIN, TIMEX
                                                                        WILKN 37
      DIMENSION OXSUM(KB+F,NDATF, LTIMF), GYSUM(KBHF,NDATF, LTIMF)
                                                                        WILKN 38
                                                                        WILKN 39
      DIMENSION CAVS(KBHF), ZCH(KBHF), TIMUP(LTIMF)
                                                                        WILKN 40
C
                                   , ALIMIT
                                                                        WILKN 41
      DATA PROGRM , VKK
                          . WILK
                                   , 999999./
                                                                        WILKN 42
     1 /6HWILKNS , 0.35 , 0.03
                                                                        WILKN 43
 1000 FORMAT(4F10.0)
                                                                        WILKN 44
                  19X, 1HK, 8X, 3HZCH, 12X, 5HDXSUM, 10X, 5HDYSUM)
 5000 FORMAT(
                                                                        WILKN 45
                                                                        WILKN 46
 5100 FORMAT( 15X, I5, 3(3X,E12.5))
```

TRIDI241

TRIDI242

TRIDI243

2090 VX(KBH, NDATA, LTIM) = VXKNL

5200 FORMAT(

VY(K8H, NDATA, LTIH) = VYKNL

15X76HTURBULENCE PARAMETERS ARE CALCULATED BY WILKINS RWILKN 47

```
1ECIPROCAL ALTITUDE FUNCTION/ 15x 10HFOR UPDATEI3, 4H AT E12.5,
                                                                           WILKN 48
                                                                           WILKN 49
     2 8H SECONDS/)
 5300 FORMAT( 14X, 22HSURFACE WIND SPEED IS E12.5, 3X, 20H MEASURED AT HWILKN 50
     1 EIGHT E12.5/ 14X, 17MROUGHNESS LENGTH=E12.5, 3X, 32HRECIPROCAL MONWILKN 51
     2IN-OBUKHOV LENGTH#E12.5, 3X, 11H(MKS UNITS)/
                                                                           WILKN 52
     3 14X, 32HSURFACE LAYER FRICTION VELOCITY=E12.5, 3X, 7H(M/SEC)/)
                                                                           WILKN 53
 590) FORMAT( 1H),9X87HCANNOT COMPUTE TURBULENCE VIA WILKINS METHOD BECAWILKN 54
     1USE ZCH ARRAY HAS NOT BEEN CONSTRUCTED/ 14X, 53HCALCULATION CANNOTHILKN 55
     2 PROCEED UNLESS WIND DATA ARE INPUT//)
                                                                           WILKN 56
                                                                           WILKN 57
CHECK IF ARRAY ZCH HAS BEEN CREATED
                                                                           WILKN 58
      IF(ZCH(1) .NE. ALIMIT) IF(MG(2)-1)50,66,50
                                                                           WILKN 59
      WRITE(ISOUT,5900)
                                                                           WILKN 60
   25 CALL ERROR (PROGRM, -25,15CUT)
                                                                           WILKN 61
   50 WRITE (ISOUT, 5200) L, TIMUP (L)
                                                                           WILKN 62
                                                                           WILKN 63
   READ DATA USED TO CALCULATE USTAR (MKS UNITS)
                                                                           HILKN 64
                                                                           WILKN 65
C
                                                                           WILKN 66
   60 READ(ISIN, 1000) U, ZM, ZO, RL
                                                                           WILKN 67
      IF(ZJ .EQ. 0.0) GO TO 300
                                                                           WILKN 68
      IF(RL .GE. 0.0) GO TO 100
                                                                           WILKN 69
   COMPUTE CHI FOR AN UNSTABLE BOUNDARY LAYER
                                                                           WILKN 70
                                                                           WILKN 71
      XI = (1.J - 15.0*ZM*RL)**0.25
                                                                           WILKN 72
      CHI = -ALOG((XI^{++}2+1.0) + (XI+1.0)^{++}2 / 8.0) + 2.0^{+}ATAN (XI)
                                                                           WILKN 73
                                                                           WILKN 74
     1 - 1.570796327
      GO TO 200
                                                                           WILKN 75
                                                                           WILKN 76
  100 CONTINUE
                                                                           RILKN 77
   COMPUTE CHI FOR A NEUTRAL OR STABLE BOUNDARY LAYER
                                                                           H11KN 78
C
                                                                           WILKN 79
C
                                                                           WILKN 80
      CHI = 4.7*ZM*RL
                                                                           WILKN 81
  200 CONTINUE
      USTAR = VKK*U / (ALCG(ZM/ZO) + CHI)
                                                                           WILKN 82
                                                                           WILKN 33
      C = USTAR**3/VKK
      IF(MC(2) .NE. 1) WRITE(ISOUT,5330)U,ZM,ZJ,RL,USTAR
                                                                           WILKN 84
      GO TO 403
                                                                           WILKN 85
                                                                           WILKN 36
  300 C = WILK
                                                                           WILKN 87
  400 CONTINUE
                                                                           WILKN 88
   COMPUTE EPS AND STORE TEMPORARILY IN CAVS
                                                                           WILKN 59
C
                                                                           WILKN 90
C
      ZGZ = ZMIN
                                                                           WILKN 91
                                                                           WILKN 92
      DO 5)0 K=1.KBHX
                                                                           WILKN 93
  500 \text{ CAVS(K)} = C/(ZCH(K) - ZGZ + ZO)
                                                                           WILKN 94
   LOAD DIFFUSION PARAMETER ARRAYS
                                                                           WILKN 95
С
                                                                           WILKN 96
                                                                           WILKN 97
      DO 630 N=1,NDATX
                                                                           WILKN 98
      DO 610 K=1.KBHX
      DXSUM(K,N,L) = CAVS(K)
                                                                           WILKN 39
                                                                           WILKN1J0
  600 DYSUM(K,N,L) = CAVS(K)
      IF (MC(2) .EQ. 1) RETURN
                                                                            WILKN1.1
      WRITE( ISOUT, 5670)
                                                                            WILKN132
      00 730 K=1,KBHX
                                                                           WILKN133
                                                                           WILKN1,4
  730 WRITE(ISOUT,5130) K, ZCH(K), DXSLM(K,1,L),DYSUM(K,1,L)
                                                                            WILKN1J5
      PETURN
                                                                           WILKN1!6
      FND
```

The Colombia district of the Colombia C

```
+DECK+CALC
                                                                           CALC
      SUBROUTINE CALC(IP, CPAP, NMAP)
                                                                           CALC
C
                                                                            CALC
C
      H.G.NORMENT
                       JUNE 25,1971
                                                                            CALC
C
                                                                           CALC
C
                                                                          **CALG
                                                                            CALC
      THIS SUBROUTINE COMPLTES MAP CONTRIBUTIONS FOR INDIVIDUAL
                                                                            CALC
C
      FALLOUT PARCELS
                                                                            CALC
                                                                                   9
C
                                                                            CALC
                                                                                  10
    C#
                                                                           * CALC
                                                                                  11
                                                                            LALC
                                                                                  12
C
                    SHALLEST POSSIBLE Y INDEX OF A CONTRIBUTION ELLIPSE
                                                                            CALC
                                                                                  13
                    SMALLES 1 POSSIBLE X INDEX OF A CONTRIBUTION ELLIPSE
C
      NOL
                                                                            CALC
                                                                                  14
C
      NOR
                    LARGEST POSSIBLE X INDEX OF A CONTRIBUTION ELLIPSE
                                                                            CALC
                                                                                  15
                    LARGEST POSSIBLE Y INDEX OF A CONTRIBUTION ELLIPSE
      TOM
                                                                            CALC
C
                                                                                  16
                    Y COORDINATE OF THE MAP POINT ROW CURRENTLY BEING
      TREL
                                                                            CALC
                                                                                  17
C
                    CONSIDERED RELATIVE TO THE PARCEL Y COORDINATE
                                                                            CALC
                                                                                  18
C
      XREL
                    X COORDINATE OF THE MAP POINT
                                                     CURRENTLY BEING
                                                                            CALC
                                                                                  19
                    CONSIDERED RELATIVE TO THE PARCEL X COORDINATE
                                                                            CALC
                                                                                  20
C
                    LEFT BOUNDRY X GOORGINATE OF THE FARCEL
                                                                            LALC
                                                                                  c1
                    CONTRIBUTION ELLIPSE IN THE YEEL MAP ROW
                                                                            GALC
                                                                                  22
                    RIGHTBOLNERY X COORDINATE OF THE PARCEL
                                                                            CALC
                                                                                  23
                    CONTRIBUTION ELLIPSE IN THE YEEL MAP ROW
C
                                                                            CALC
                                                                                  4
C
                    NUMBER OF MAP POINTS SPANNED BY A FARCEL
      NHX
                                                                                  25
                                                                            CALC
                    CONCENTRATION ELLIPSE IN A ROW
                                                                            CALC
                                                                                  26
      VARX2
                    2.0 + GAUSSIAN DISTBN. VARIANCE ALONG A AXIS
                                                                            CALC
                                                                                  27
      VARY2
                    2.0 *GAUSSIAN DISTBN. VARIANCE ALONG 8 AXIS
                                                                            CALC
                                                                                  28
                    MAGNITUCE(I.E. INTEGRATED VALUE) OF A FARCEL
                                                                            LALC
                                                                                  29
C
                    PROPERTY TO BE DISTRIBUTED ON THE MAP
                                                                            CALU
                                                                                  30
C
                                                                            CALC
                                                                                  31
      ALSO SEE OPHI GLOSSARY AND PCHECK GLOSSARY
                                                                            CALC
                                                                                  32
C
                                                                            LALC
                                                                                  33
                                                                          ** UALC
                                                                                  34
                                                                            CALC
                                                                                  35
      COMMON /CONDAT/
                                        BUHI,
                                                    ,IPNCH
                                                               , IPOUT
                                                                           , CALC
                             IC (2u)
                                                                                  36
                , ISOUT
                            .JPOUT
                                        , KPOUT
     1ISIN
                                                    .KT AFE
                                                               .L TAPE
                                                                           . CALC
                                                    . INPAM
     ZMARRAY
                 .MBTAPE
                            •MXREQ
                                        .30
                                                                            CALC
                                                                                  30
      COMMON /MAPDAT/ CAYE .CUTMAP
                                        , DGX
                                                    • CG Y
                                                               .IH .IV
                                                                           . LALC
                                                                                  39
                 . NXMAP
                            NYMAP
                                                               ,SSAM
                                        , NZ
                                                                           . CALC
     1.30
                                                    ,0CUT
                                                                                  40
                 , XG Z
                                        , x 2
                            ,X1
                                                                           , CALC
     2 T G 7
                                                    . YG 7
                                                               .XMAX
                                                                                  41
     NIMXE
                 YMAX
                            ,YMIN
                                        ,ZMIN
                                                                            LALU
                                                                                  42
      COMMON /PARDAT/
                             ASQ
                                        ,BSQ
                                                    COSA
                                                                           , UALC
                                                                                  43
                            ,PMAS(1JJ) ,PSIZ(1JO) ,EO(140)
                                                               .SIGXO(100),CALS
     1 G AM A
                 ,KTR (100)
                                                                                  44
     2SIGYO(100), SINA
                                                                           . CALC
                            , TPAR(103) , XPAR(100) , YPAF(100) , YPRML
                                                                                  45
     3 YPR MU
                .ZPAR (100)
                                                                            LALC
                                                                                  46
      COMMON /RUNDAT/
                            C
                                        ,CF6
                                                    ·FS UM
                                                               ,ICTR
                                                                           . CALC
                                                                                  47
                • NE
                                        O'AUR.
     1 MAPRUN
                            , NI J
                                                               .NTASK
                                                                           • CALC
                                                                                  44
                                        .WFMAS (23.)
     20PMID(12) ,T1
                                                                            CALC
                                                                                  49
      DIMENSION OMAP(NMAP)
                                                                            LALC
                                                                                  5 Ü
      DATA PROGRM/6HCALC /
                                                                            CALC
                                                                                  51
C
                                                                            CALC
                                                                                  52
C
      INITIALIZE FOR THIS PARCEL
                                                                            CALC
                                                                                  53
                                                                            LALC
                                                                                  54
      VARX2= ASQ/GAME
                                                                                  55
                                                                            UALC
      VARY2= BSQ/GAMA
                                                                            CALC
                                                                                  56
      A = SINA*COSA*(1.0/VARY2- 1.0/VARX2)*2.J
                                                                            CALC
                                                                                  57
      B = 4.0/VARX2/VARY2
                                                                            LALC
                                                                                  56
      CC= (COSA**2/VARX2 + SINA**2/VARY2)*2.1
                                                                            CALL
                                                                                  59
      D = 2.0 + GAMA + CC
                                                                            CALC
                                                                                  51
```

```
Q = F/SIGXO(IP)/SIGYC(IP)/6.28318531
                                                                             CALC
                                                                                   61
                                                                             CALC
                                                                                   62
C
      COMPUTE SMALLEST Y INDEX OF A CONTRIBUTION
                                                                             CALC
                                                                                   63
                                                                             CALC
                                                                                   64
      NOB = (YPRML - YMIN)/DGY
                                                                             CALC
                                                                                   65
      NOB= NOB+1
                                                                             CALC
                                                                                   66
      IF(NOB.LT.1) NOB=1
                                                                             CALC
                                                                                   67
  100 IF(NOB.LE.NYMAP) GO TO 120
                                                                             CALC
                                                                                   68
  116 IRROR=-110
                                                                             CALC
                                                                                   69
      GO TO 400
                                                                             LALC
                                                                                   70
                                                                             CALC
                                                                                   71
      COMPUTE LARGEST Y INDEX OF A CONTRIBUTION
C
                                                                             CALC
                                                                                   72
C
                                                                             CALC
                                                                                   73
  120 NOT = (YPRMU - YMIN)/DGY
                                                                             CALC
                                                                                   74
      IF (NOT. GT. NYHAP) NOT=NYMAP
                                                                             CALC
                                                                                    75
      IF(NOT.GT.0 ) GO TO 140
                                                                             CALC
                                                                                   76
  130 IRROR=-130
                                                                             CALC
                                                                                   77
      GO TO 400
                                                                             LALC
                                                                                    78
                                                                             CALC
C
                                                                                    79
      ENTER THE MAP ROW LCCP
                                                                             CALC
C
                                                                                    80
                                                                             CALC
C
  14C DO 350 J=NOB, NOT
                                                                             LALC
                                                                             CALC
                                                                                    83
      COMPUTE THE LIMITING X COORDINATES OF THE PARCEL CONTRIBUTION
                                                                             CALC
                                                                                    84
      ELLIPSE IN THIS ROW
                                                                             UALC
                                                                                    45
C
                                                                             CALC
                                                                                    86
      YREL = J
                                                                             CALC
                                                                                    7 ل
      YREL = YMIN + DGY*YREL - YPAR(IP)
                                                                             CALC
                                                                                    88
      RADIC = ~8*YREL**2+D
                                                                             CALC
                                                                                    89
      IF(RADIC.GE.0.0) GO TO 160
                                                                             CALC
                                                                                    90
  150 RADIC=G.0
                                                                             CALC
                                                                                    41
                                                                             CALC
      CALL ERROR (PROGRH.
                                                                                    92
                          150, ISOUT)
  160 RADIC=SORT (RADIC)
                                                                             CALC
                                                                                    93
      XL=XPAR(IP)+ (YREL*A- RADIC)/CC
                                                                             CALC
      XR = XL + 2.J*RADIC/CC
                                                                             CALC
                                                                                    95
                                                                             CALC
                                                                                    96
      COMPUTE SMALLEST X INDEX OF A CONTRIBUTION
C
                                                                             CALC
                                                                                    97
C
                                                                             CALC
                                                                                    48
      NOL = (XL-X1)/DGX
                                                                             CALC
                                                                                   59
      NOL=NOL+1
                                                                             CALC 100
      IF(NOL.LT.1) NOL=1
                                                                             CALC 141
      IF(NOL.GT.NXMAP) GO TO 350
                                                                             CALC 152
                                                                             CALC 103
C
C
      COMPUTE LARGEST X INDEX OF A CONTRIBUTION
                                                                             CALC 104
                                                                             CALC 1J5
  180 NOR = (XR-X1)/DGX
                                                                             CALC 116
      IF (NOR. GT. NXMAP) NOR=NXMAP
                                                                             CALC 1.7
                                                                             CALC 118
      IF(NOR.LT.1) GO TO 350
                                                                             CALC 109
  200 NWX = NOR - NOL
                                                                             CALC 116
      IF(NWX+1)210,350,220
                                                                             CALC 111
  210 IRROR=-210
                                                                             CALC 112
      GO TO 403
                                                                             CALC 113
C
C
      COMPUTE OMAP(N) ARRAY INCEX EXTREMES FOR MAP POINTS IN THIS ROW
                                                                             CALC 114
                                                                             CALC 115
                                                                             CALC 116
  228 MCRMT=(J-1) *NXMAP
      K = NOL + M(RHT
                                                                             CALC 117
                                                                             CALC 118
       L = K + NWX
                                                                             CALC 119
       ADJUST OR ADD CONTRIBUTIONS TO THE MAP POINTS
                                                                             CALC 128
```

```
CALC 121
      GO TO (224,224,221,221,222,222), NORD
                                                                        CALC 122
                                                                        CALC 123
 221 OMA=TPAR(IP)
                                                                        CALC 124
      GO TO 224
                                                                        CALC 125
  222 OMA=PSIZ(IP)*1.0E6
                                                                        CALC 126
  224 DO 300 M=K.L
                                                                        CALC 127
      GO TO (225, 245, 230, 240, 230, 240), NORD
                                                                        CALC 128
  225 OMAP(M) = OMAP(M) +1. C
      GO TO 301
                                                                        CALC 129
                                                                        CALC 130
  230 OMAP(M) = AMIN1(OMA,OMAP(M))
                                                                         CALC 131
      GO TO 310
  240 OMAP(M) = AMAX1(OMA,OMAP(M))
                                                                         CALC 132
      GO TO 300
                                                                         CALC 133
  245 XREL=M - MCRHT
                                                                        CALC 134
     XREL = X1 + DGX*XREL - XPAR(IP)
                                                                        CALC 135
      OMA = Q*EXP( - (XREL*COSA + YREL*SINA) +*2/VARX2 - (YREL*GOSA
                                                                        CALC 136
     1 - XREL+SINA) ++2/VARY2)
                                                                         CALC 137
                                                                         CALC 138
  250 \text{ OMAP(M)} = \text{OMAP(M)} + \text{CMA}
  300 CONTINUE
                                                                         CALC 139
                                                                         CALG 140
  350 CONTINUE
                                                                        CALC 141
      RETURN
                                                                        CALC 142
  400 CALL ERROR (PROGRY, IRROR, ISOUT)
                                                                        CALC 143
      END
*DECK, CONTOR
                                                                        CONTO
      SUBROUTINE CONTOR ( CCNTUR, CROLBL , UMAP , NMAP)
                                                                         CONTO
                                                                         CONTO
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - JANUARY 1979
                                                                         CONTO
                                                                         CONTO
                                                                 *******CONTO
                                                                         CONTO
      DETERMINE UNORDERED SETS OF POINTS ( A MAXIMUM OF 300 IS ALLOHED) CONTO
C
      THAT LIE ON THE CONTOURS SPECIFIED BY ARRAY CONTUR. LINEAR
                                                                        CONTO
C
      INTERPOLATION BETHEEN MAP POINTS IS USED. SK SKTCHT IS CALLED TOCONTO 10
C
C
      ORDER THE POINTS IN SEQUENCE AROUND THE CLOSED SECTIONS OF THE
                                                                        CONTO 11
                                                                         CONTO 12
      CONTOURS.
                                                                         CONTO 13
 CONTO 15
                                      *IHOB
                                                 .IPNCH
                                                            , IPUUT
      COMMON /CONTAT/
                            IC(20)
                                                                        .CONTO 16
                           , JPOUT
                                      , KPOUT
                                                 , KT APE
                                                             LTAPE
                                                                        ,CONTO 17
               , I SOUT
     1ISIN
                           MXREQ
                                      ,SO
                                                 .IN PAM
                , MBTAPE
                                                                         CONTO 18
     2 MARRAY
                                                            .IH .IV
      COMMON /MAPDAT/ CAYF , CUTMAP
                                      ,DGX
                                                 , DG Y
                                                                        ,CONTO 19
                           NYMAP
                                                            ,SSAM
                NXMAP
                                      , NZ
                                                 . GC U T
                                                                        , CONTO 20
     1 JC
                           , X1
                                                                        ,CONTO 21
                • XGZ
                                      •X2
                                                 , YG Z
                                                             ,XMAX
     2 TGZ
                           ,YMIN
                                                                         CONTO 22
     3 XMIN
                , YMAX
                                      ,ZMIN
      DIMENSION OMAP(NMAP), CONTUR( 8), X(300), Y(360)
                                                                         CONTO 23
                                                                         CONTO 24
      DATA PROGRM/6HCONTOR/
                                                                         CONTO 25
C
      DO 990 L=1.8
                                                                         CONTO 26
                                                                         CUNTO 27
      IF( CONTUR(L) .EQ. (.0) GO TO 999
      CNT = CONTUR(L)
                                                                         CONTO 28
                                                                         CONTO 29
      K = 0
                                                                         CONTO 30
COMPUTE CONTOUR INTERSECTIONS ALONG HAP ROWS
```

CONTO 32

DO 400 I=1, NYMAP

DO 430 J=2, NXMAP

```
400.200.200
                                                                          CONTO 34
     IF (OMAP (NXMAP* (I-1)+J) .GT. CNT) GO TO 460
                                                                          CONTO 35
 200 K = K + 1
                                                                          CONTO 36
     IF( K . GT. 300) CALL ERROR(PROGRM, -200, ISOUT)
                                                                          CONTO 37
      Y(K) = YMIN + I + DGY
                                                                          CUNTO 38
     X(K) = XMIN + (J-1) + DGX + (CNT - OMAP(NXMAP+(I-1)+J-1)) + DGX/
                                                                          CONTO 39
    1 (OMAP(NXMAP+(I-1)+J) - OMAP(NXMAP+(I-1)+J-1))
                                                                          CONTO 40
  400 CONTINUE
                                                                          CONTO 41
COPPUTE CONTOUR INTERSECTIONS ALONG MAF COLUMNS
                                                                          CONTO 42
      DO 900 J=1.NXHAP
                                                                          CONTO 43
      00 900 I=2,NYMAP
                                                                          CONTO 44
      IF(OMAP(NXMAP*(I-2)+J) .LE. CNT) IF(OMAP(NXMAP*(I-1)+J) - CNT)
                                                                          CONTO 45
       900,700,700
                                                                          CONTO 46
      IF (OMAP (NKMAP* (I-1)+J) .GT. CNT) GO TO 900
                                                                          CONTO 47
 700 K = K + 1
                                                                          CONTO 48
      IF( K .GT. 300) CALL ERROR(PROGRM. -704. ISOUT)
                                                                          CONTO 49
      X(K) = XMIN + J DGX
                                                                          CONTO 50
      Y(K) = YMIN + (I-1)*DGY + (CNT - DMAP(NXMAP*(I-2)+J))*DGY/
                                                                          CONTO 51
      \{OMAP(NXHAP*(I-1)+J) - OMAP(NXMAP*(I-2)+J)\}
                                                                          CONTO 52
 900 CONTINUE
                                                                          CONTO 53
      00 950 I=1,K
                                                                          CONTO 54
  950 WRITE(ISOUT,1000) X(I),Y(I), CNT
                                                                          CONTO 55
 1109 FORMAT( 3F10.0)
                                                                          CONTO 56
      CALL SRTCHT( X, Y, CHT, K, CROLBL)
                                                                          CONTO 57
  990 CONTINUE
                                                                          CUNTO 58
  999 RETURN
                                                                          CONTO 59
                                                                          CONTO 60
      END
*DECK . GOGO
                                                                          GOGO
      SUBROUTINE GOGO (OMAP . NMAP)
                                                                          GOGO
                                                                          GOGO
C
      H.G.NORMENT
                      JUNE 28,1971
                                                                          GOGO
                                                                          GOGO
 ******
                                                                       * * * GOGO
                                                                                 6
                                                                          GOGO
C
C
      THIS SUBROUTINE, WHICH IS CALLED BY UPP'2, CONTROLS READ-IN OF
                                                                          60G0
      PARCEL DATA. IT ROLTS PROCESSING OF THE DATA, AND CONTROLS
                                                                          GUGO
                                                                                 9
      LOADING OF THE DATA ON TO TEMPORY STORAGE TAPE.
C
                                                                          GOGO
                                                                                10
C
                                                                          GOGO
                                                                                11
      ************************** GLOSSARY **********
C 44
                                                                        ** GOGO
                                                                                12
      ICTR
                   A CONTROL PARAMETER - WHEN ICTR.ME.NZ , ANOTHER
                                                                          60G0
                   MAP CORE LOAD IS SIGNALED TO FOLLOW
                                                                          GOGO
                                                                                15
С
                   A BLOCK COUNT OF DATA STOREC ON TAFE AND/OR IN CORE
C
      NIJ
                                                                          GOGO
                                                                                16
C
                   NUMBER OF MAP CORE LOADS PEQUIRED BEYOND THE FIRST
                                                                          GOGO
                                                                                17
                                                                          GOGO
                                                                                18
      ALSO SEE OPM1 GLOSSARY
                                                                          60 GO
                                                                                19
C
                                                                          GOGO
                                                                                20
                                                                         # GOGO
¢
                                                                                ٤1
                                                                          GOGO
                                                                                22
      COMMON /CONDAT/
                                       ,IHOB
                                                  . IPNCH
                                                             .IPUUT
                            IC(23)
                                                                         , GO GO
                .ISOUT
                            , JPOUT
                                       ,KPUUT
                                                  ,KT AFE
                                                                         ,GOGO
                                                                                24
                . MBTAPE
                           , MXREQ
                                       • Su
                                                  > IN FAM
                                                                                25
     2 HARRAY
                                                                          GOGO
      COMMON /MAPDAT/ CAYF ,CUTHAP
                                                             ,IH ,IV
                                       ,DGX
                                                                                26
                                                  , EG Y
                                                                         , GOGO
                . NXHAP
                            ,NYMAP
                                                  , QCUT
                                                                         , G0G0
                                                              , SSAM
                                                                                27
     1 JC
                                       2 N Z
```

IF(OMAP(NXMAP*(I-1)+J-1) .LE. CNT) IF(CMAP(NXMAF*(I-1)+J) - CNT)

CONTO 33

```
2 TGZ
                  , XGZ
                              ,X1
                                           ,X2
                                                        , YG Z
                                                                    , X MA X
                                                                                 , GOGO
                                                                                         28
     3 XMIN
                  .YMAX
                              .YMIN
                                           .ZMIN
                                                                                 GOGO
                                                                                         29
      COMMON /PARDAT/
                               ASQ
                                                                    , F
                                           ,BSQ
                                                        +COSA
                                                                                 , GO GO
                                                                                         30
                  ,KTR (100)
     1 GAMA
                               ,PMAS(100) ,PSIZ(100) ,RO(100)
                                                                    ,SIGXU(100),GOGU
                                                                                         31
                                                                    , YPR ML
     2SIGYO (100), SINA
                               ,TPAR(100) ,XPAR(130) ,YPAR(100)
                                                                                 , GOGO
                                                                                         32
     3 YPR MU
                  , ZPAR (100)
                                                                                  GOGO
                                                                                         33
      COMMON /RUNDAT/
                                           .CF6
                                                        .FSUM
                                                                    .ICTR
                                                                                 , GOGO
                                                                                         34
     1 MAPRUN
                  , NE
                                           , NORD
                              ,NIJ
                                                                                         35
                                                        , NREG
                                                                    , NTASK
                                                                                 . GUGO
     20PMID(12) ,T1
                              ,T2
                                           .WFMAS (200)
                                                                                  GOGO
                                                                                         36
      DIMENSION OMAP(NMAP)
                                                                                  GOGO
                                                                                         37
      DATA PROGRM/6HGOGO
                                                                                  GUGO
                                                                                         38
C
                                                                                  GOGO
                                                                                         39
      IJIN=1
                                                                                  GOGO
                                                                                         40
C
      READ A DATA BLOCK COUNT
                                                                                  GUGO
                                                                                         41
                                                                                  GOGO
C
                                                                                         42
  100 READ(KTAPE) NIJ
                                                                                  GUGO
                                                                                         43
C
                                                                                  GOGO
                                                                                         44
C
       ARE WE FINISHED PRCCESSING THE DATA-
                                                                                  GOGO
                                                                                         45
C
                                                                                  GOGO
                                                                                         46
       IF(NIJ.EQ.6) GO TO 400
                                                                                  GOGO
                                                                                         47
       IF(NIJ.LE. MARRAY) GO TO 200
                                                                                  GOGO
                                                                                         48
  150 IRROR=-150
                                                                                  GOGO
                                                                                         49
  160 CALL ERROR (PROGRM, IRROR, ISOUT)
                                                                                  GOGO
                                                                                         5 D
C
                                                                                  GOGO
                                                                                         51
C
       READ A BLOCK OF PARCEL DATA
                                                                                  GOGO
                                                                                         52
C
                                                                                  GOGO
                                                                                         53
  200 READ(KTAPE) (AFAP(I), YPAR(I), ZPAR(I), TPAR(I), SIGXO(I), SIGYO(I),
                                                                                         54
                                                                                  GUGO
     1 RO(I), PSIZ(I), PMFS(I), 1 1, NIJ)
                                                                                  GUGO
                                                                                         55
                                                                                  GÜGÖ
                                                                                         56
C
       CALL PCHECK TO BEGIN PROCESSING THE PARTICLE DATA INTO A MAP
                                                                                  GOGO
                                                                                         57
C
                                                                                  GOGO
                                                                                         58
       CALL PCHECK(IJIN, OMAP, NMAP)
                                                                                  60G0
                                                                                         59
       IF (NZ.EQ.ICTR) GO TO 100
                                                                                  GOGO
                                                                                         60
C
                                                                                  GOGG
                                                                                         61
C
       CALL POMP TO DUMP PARTICLE DATA ON TO TAPE FOR USE IN SUBSEQUENT
                                                                                  GCGO
                                                                                         62
C
       MAP CORE LOADS
                                                                                  GOGO
                                                                                         63
                                                                                  GOGQ
                                                                                         64
       IF(NIJ .GT. NE) CALL POMP
                                                                                  6060
                                                                                         65
                                                                                  GOGO
       GOTO 100
                                                                                         66
  400 RETURN
                                                                                  GOGO
                                                                                         67
       END
                                                                                  GUGO
                                                                                         68
```

te a more distribution of a mississive modern account in a mississification of the commencer of the programme of

```
MAP
*DECK , MAP
      SUBROUTINE MAP (OMAP, NMAP)
                                                                            MAP
                                                                            MAP
C
      T. W. SCHWENKE 26 FEBRUARY 1967
                                                                            MAP
C
      MODIFIED 1 FEBRUARY 1979 BY H& G. NORMENT
                                                                            MAP
                                                                            MAP
C
                                                                           MAP
C
                                                                            MAP
C
      DELFIC MAP PRINTER
C
                                                                            MAP
                                                                                  10
       **MAP
                                                                                   11
                                                                            MAP
                                                                                  12
                                        .IHOB
                                                               , IPOUT
                                                    , IPNCH
                                                                           . MAP
      COMMON /CONDAT/
                             IC(20:
                                                                                   13
                            JPUUT
                . TSOUT
                                        , KPOUT
                                                    , KT APE
                                                                           , MAP
     1 ISIN
                                                               . L TAPE
                                                                                  14
                            , MXREQ
                                        ,50
                                                    . IN FAM
     2MARRAY
                 . MBTAPE
                                                                            MAP
                                                                                   15
      COMMON /MAPDAT/ CAYF .CUTMAP
                                        ,DGX
                                                                ,IH ,IV
                                                                           NAP
                                                    • DG Y
                                                                                   16
     1JC
                , NXMAP
                             NYMAP
                                        • NZ
                                                    • GOUT
                                                               ,SSAM
                                                                           , MAP
                                                                                   17
     2 TGZ
                            .X1
                                                                           , HAP
                 , XGZ
                                        • X2
                                                    , YGZ
                                                                *XMAX
                                                                                   18
                                                                            MAP
     HIMXE
                 . YMAX
                                        , ZMIN
                                                                                   19
                             ,YMIN
                                                    ,FSUM
                                                                ,ICTR
                                                                           , MAP
      COMMON /RUNDAT/
                                        CF6
                                                                                   20
                            C
                            ,NIJ
                                        , NORD
     1 MAPRUN
                , NE
                                                                .NTASK
                                                                           . MAP
                                                                                   21
     20PHID(12) ,T1
                                        , WFMAS (230)
                                                                            MAP
                             .T2
                                                                                   22
      COMMON /OUTPUT/ FISHUM.FP(200), FW, NDSTR, JGC, MASCHN, PS(200),
                                                                            MAP
                                                                                   23
                                                                            MAP
     1 FMASS(200),DIAM(201)
                                                                                   24
                                                                                   25
      DIMENSION JHAP (20) , CHAP (NMAP)
                                                                            MAP
                                                                            MAP
                                                                                   26
      INTEGER BLANK
      DIMENSION FATEXP(21), FATRUT(21, ABSSA(10)
                                                                            MAP
                                                                                   27
      DATA FMTEXP(1), FMTRUT(1), FMTEXP(21), FMTRUT(21), BLANK, FMTA, FMTF,
                                                                            MAP
                                                                                   28
                                           , 6H)
                                                                            MAP
                                                                                   29
          FM[I/6H(/1X, ,6H(5X, ,6H)
                                                     •6H
                            /, DOT/6H
                  •6HI6
                                                                            MAP
          6HF6.3
                                                                                   30
                                                                            MAP
Ċ
                                                                                   31
                                                                            MAP
      DATA BITLUM, INC, LREW/ 6HMULTIB, 19, 0/
                                                                                   32
                                                                            MAP
      FORMAT(1H1,5HSTRIPI3,5X, 12A6, 5X, 8HMAP TYPEI3)
                                                                            MAP
      FORMAT(/12X,1916)
                                                                            MAP
                                                                                   35
      FORMAT(1H+, 32X, 17HTWO-LINE E FORMAT)
                                                                            MAP
                                                                                   36
      FORMAT(1X, F13.0, 2X, 19F6.3)
                                                                            MAP
                                                                                   37
                                                                            MAP
                                                                                   38
      FORMAT(1H+, 32X, 21HTWO-LINE F11.3 FORMAT)
      FORMAT(16HODISPLAY METHOD 14,33H %S NOT AVAILABLE. USED METHOD 1.) MAP
                                                                                   39
                                                                                   40
      FORMAT(//15X, 18HTHIS MAP USES THE )
      FORMAT(//15X,25HTHE QUANTITY PRESENTED IS)
                                                                            MAP
                                                                            MAP
      FORMAT(15X, 43HA COUNT OF CONTRIBUTING DEPOSIT INCREMENTS.)
 a
                                                                            MAP
      FORMAT(15X, 42HEXPOSURE RATE NORMALIZED TO TIME H+1 HOUR.)
 10
      FORMAT(15X, 24HEXPO SURE RATE AT TIME HOF10.1,9H SECONDS.)
                                                                            MAP
 11
      FORMAT(15X,36HEXPOSURE ACCUMULATED BETHEEN TIME H+F1U.1,22H SECONDMAP
                                                                            MAP
     1S AND INFINITY.)
      FORMAT(15%, 36HEXPOSURE ACCUMULATED BETWEEN TIME H+F10.1,12H AND TIMA?
                                                                                   47
                                                                            MAP
     1ME H+F10.1,9H SECONDS.)
                                                                                   48
      FORMAT(15X,6)HTOTAL MASS PER UNIT AREA OF CONTRIBUTING DEPOSIC INCHAP
                                                                            MAP
     1PEHENTS.)
      FORMAT(15x, 43HMASS PER UNIT AREA DEPOSITED BETHEEN TIMES F13.1.5H MAP
                                                                                   51
 15
     1AND F10.1,9H SECONES.)
                                                                            MAP
                                                                                   52
                                                                                   53
      FORMAT(/ 3X, 4H*** , 10F12.0, 3H **/)
                                                                            MAF
 16
                                                                            MAP
      FORMAT(15x, 41 HASSUMES ALL PARTICLES ARE GROUNDED BY T1.)
 17
      FORMAT(15X, 27HACTIVITY DUE TO MASS CHAIN 14)
                                                                            MAP
 16
                                                                            MAP
      FORMAT(15X, 26H MULTIPLE BURST BINARY TAPE)
 19
 20
      FORMAT(15X, 31HGROUNC ZERC IS LOCATED AT X = F10.1,8h
                                                                                   58
     1)
                                                                            MAP
      FORMAT(15%, 46HTIME (SECONDS) OF CNSET OF FALLOUT DEPOSITION.)
                                                                                   59
 23
      FORMAT(15%, 50HTIME (SECONDS) OF CESSATION OF FALLOUT DEPUSITION.) MAP
```

```
25
     FORMAT(15X,5CHDIAMETER (MICRONS) OF SMALLEST DEPOSITED PARTICLE.) MAP
 26
     FORMAT(15X, 49HDIAMETER (MICRONS) OF LARGEST DEPOSITED PARTICLE.) MAP
                                                                             62
     FORMAT(15X, 58HMASS DEPOSITED (KGM/M*+2) BY PARTICLES IN THE SIZE RMAP
 27
                                                                             63
     1ANGE , E12.5, 4H TO , E12.5, 8H METERS.)
                                                                       MAP
                                                                             64
 28
     FORMAT(15X,77HH+1 HCUR NCRMALIZED EXPOSURE RATE RESULTING FROM PARMAP
                                                                             65
    ITICLES IN THE SIZE RANGE , E12.5,4H TO , E12.5,8H METERS.)
                                                                       MAP
                                                                             66
 29
      FORMAT(15X,28HUNITS ARE ROENTGENS PER HOUR)
                                                                       MAP
                                                                             67
 30
     FORMAT(15X, 19RUNITS ARE ROENTGENS)
                                                                       MAP
                                                                             68
 31
     FURMAT(15X.18HUNITS FRE KGM/M**2)
                                                                       MAP
                                                                             69
 32
     FORMAT(15x, 21HUNITS ARE CURIES/M++2)
                                                                       MAP
                                                                             70
 33
     FORMAT(15X, 56HTIME OF ARFIVAL ACCOUNTED FOR BY THE APPROXIMATE, METMAP
                                                                              71
    1HOD.)
 34
     FORMAT(15X,50HT1HE OF ARTIVAL ACCOUNTED FOR BY THE EXACT METHOD.) MAP
                                                                              73
 35
      FORMAT(15%, 34HUNITS ARE EQUIVALENT FISSIONS/M**2)
                                                                       MAP
                                                                             74
                                                                       MAP
                                                                              75
 99
      IF (MAPRUN) 101,188,161
                                                                       MAP
                                                                             76
 100 DO 1000 I=2,20
                                                                       MAP
                                                                              77
     FMTEXP(I)=BLANK
                                                                       MAP
                                                                              78
 1000 FMTRUT(I)=BLANK
                                                                       MAP
                                                                              79
     TINC=2.5*CGX
                                                                       MAP
                                                                              80
      XCOORD= XMIN+0GX
                                                                       MAP
                                                                              81
      VINC=INC
                                                                       MAP
                                                                              82
     XCINC=VINC*DGX
                                                                       MAP
                                                                              83
      KK1.=1
                                                                       MAP
                                                                              84
     NX=NXMAP
                                                                       MAP
                                                                              85
     LEFT IS USED HERE AS A TEMPORARY STORAGE
                                                                       MAP
                                                                              86
     LEFT= (XMAX-X1) /DGX
                                                                       MAP
                                                                             87
C
      PRINT MAP TITLE
                                                                       MAP
                                                                              88
      WRITE (ISOUT,7)
                                                                       MAP
                                                                              89
      SELECT APPROPRIATE DISPLAY OPTION GODE
                                                                       MAP
                                                                              90
                                                                       MAP
     IF (JC
            1147,147,131
                                                                             91
     IF (JC
 131
              -6) 132, 132, 147
                                                                       MAP
                                                                              92
 130
     JC
          =1
                                                                       MAP
                                                                              93
 132 N1=JC
                                                                              94
                                                                       MAP
      GO TO (141, 146, 143, 144, 145, 146), N1
                                                                       MAP
                                                                             95
     ASSIGN 150 TO NZ
                                                                       MAP
                                                                             46
      WRITE (ISOUT, 3)
                                                                       MAP
                                                                              97
     GO TO 102
                                                                       MAP
                                                                             QA
     ASSIGN 151 TO N2
                                                                       MAP
                                                                             99
      WRITE (ISOUT.5)
                                                                       MAP
                                                                             100
      GO TO 102
                                                                       MAP
                                                                             101
     FRITE(ISOUT, 19)
                                                                       MAP
                                                                             102
      ASSIGN 301 TO N2
                                                                       MAP
                                                                             193
     IF(LREW.NE. 0) GO TO 1431
                                                                       MAP
                                                                             104
     LREW=1
                                                                       MAP
                                                                             105
     REWIND MBTAPE
                                                                       MAP
 1431 WRITE (MBTAPE) BITLUM
                                                                       MAF
                                                                             107
     WRITE (MBTAPE) XMIN, XMAX, YMIN, YMAX, OGX, DGY
                                                                       MAP
                                                                             138
      GO TO 102
                                                                       MAP
                                                                             1119
                                                                       MAP
C
                                                                             110
111
 144 CONTINUE
                                                                       MAP
                                                                             112
 145 CONTINUE
                                                                       MAP
                                                                             113
 146 CONTINUE
                                                                       MAP
                                                                             114
115
C
                                                                             116
     WRITE (ISOUT, 6) N1
                                                                       MAP
                                                                             117
     GO TO 130
                                                                       MAP
                                                                             118
 101
     KKL=1
                                                                       MAP
                                                                             119
      NX=NXMAP
                                                                       MAP
                                                                             120
```

```
LEFT IS USED HERE AS A TEMPORARY STOPAGE
                                                                                 MAP
                                                                                       121
C
      LEFT=(XMAX-X1)/DGX
                                                                                 MAP
                                                                                       122
      GO TO 1702
                                                                                 MAP
                                                                                       123
       PRINT ORDINATE DESCRIPTION
                                                                                 MAP
C 102
                                                                                       124
                                                                                 MAP
C
                                                                                       125
 102
      WRITE (ISOUT, 8)
                                                                                 MAP
                                                                                       126
C
      NREQ ... 1, 2, 3, 4, 5, 6, 7, 6, 9, 10, 11, 12, 13, 14, 15, MAP
                                                                                       127
      GO TO.161, 162, 163, 177, 164, 165, 168, 169, 164, 165, 166, 167, 176, 171, 172, MAP
                                                                                       128
             173,174,175),NREQ
                                                                                       129
      NREQ - 16, 17, 18
                                                                                 MAP
                                                                                       130
      WRITE (ISOUT.9)
                                                                                 MAP
                                                                                       131
 161
                                                                                 MAP
      GO TO 170
                                                                                       132
                                                                                 MAP
                                                                                       133
 162
      WRITE (ISOUT, 10)
                                                                                 MAP
      WRITE (ISOUT, 29)
                                                                                       134
      GO TO 171
                                                                                 MAP
                                                                                       135
      WRITE (ISOUT, 11) T1
                                                                                 MAP
                                                                                       136
      WRITE (ISOUT, 29)
                                                                                 MAP
                                                                                       137
      GO TO 173
                                                                                 MAP
                                                                                       138
      WRITE (ISOUT, 12) T1
                                                                                 MAP
                                                                                       139
       WRITE (ISOUT.30)
                                                                                 MAP
                                                                                       140
                                                                                 MAP
      IF(NREQ .EQ. 9) GO TO 1264
                                                                                       141
 1164 WRITE (ISOUT, 33)
                                                                                 MAP
                                                                                       142
      GO TO 176
                                                                                 MAP
                                                                                       143
                                                                                 MAP
 1264 WRITE(ISOUT.34)
                                                                                       144
                                                                                 MAP
      GO TO 172
                                                                                       145
                                                                                 MAP
      WRITE (ISOUT, 13) T1, T2
                                                                                       145
                                                                                 MAP
                                                                                       147
      WRITE (ISOUT, 30)
                                                                                 MAP
                                                                                       148
      IF(NREQ-10) 1164, 1264, 1264
      WRITE (ISOUT,14)
WRITE (ISOUT,31)
                                                                                 MAP
 166
                                                                                       149
                                                                                 MAP
                                                                                       150
                                                                                 MAP
                                                                                       151
      GO TO 179
      WRITE (ISOUT, 15) T1, T2
                                                                                 MAP
                                                                                       152
 167
      WRITE (ISOUT, 31)
                                                                                 MAP
                                                                                       153
       GO TO 17)
                                                                                 MAP
                                                                                       154
                                                                                 MAF
                                                                                       155
      WRITE (ISOUT, 13) T1, T2
 168
      WRITE (ISOUT, 36)
                                                                                 MAP
                                                                                       156
                                                                                 MAP
                                                                                       1,57
      WRITE(ISOUT,17)
                                                                                 MAP
                                                                                       158
      GO TO 170
     WRITE (ISOUT, 12) T1
                                                                                 MAP
                                                                                       159
 169
                                                                                 MAP
                                                                                       165
      WRITE (ISOUT, 30)
                                                                                 MAP
      WRITE (ISOUT, 17)
                                                                                       161
      GO TO 173
                                                                                 MAP
                                                                                       162
                                                                                 MAP
 171 WRITE (ISOUT, 18) MASCHN
                                                                                       163
                                                                                 MAP
       IF(T1-TGZ .GY. 0.0) WRITE(ISOUT, 32)
                                                                                       164
       IF(T1-TGZ .EQ. 0.0) WRITE(ISOUT, 35)
                                                                                 MAP
                                                                                       165
       GO TO 179
                                                                                 MAP
                                                                                       166
      WRITE (ISOUT, 23)
                                                                                 MAP
                                                                                       167
 172
                                                                                 MAP
                                                                                       168
       GO TO 170
                                                                                 MAP
       WRITE (ISOUT, 24)
                                                                                       169
                                                                                 MAP
       GO TO 170
                                                                                       170
                                                                                 MAP
                                                                                       171
      WRITE (ISOUT, 25)
 174
                                                                                 MAP
                                                                                       172
       GO YO 170
                                                                                 MAP
                                                                                       173
       WRITE (ISOUT, 26)
 175
       GO TO 170
                                                                                 MAP
                                                                                       174
                                                                                 MAP
                                                                                       175
       WRITE (ISOUT, 27) T1, T2
 176
                                                                                 MAP
                                                                                       176
       GO TO 170
                                                                                 MAP
                                                                                       177
       WRITE (ISOUT, 28) T1, T2
                                                                                 MAP
                                                                                       178
       WRITE (ISOUT, 29)
                                                                                 MAP
                                                                                       179
       GO TO 179
                                                                                 MAP
                                                                                       180
С
```

Control of the Contro

```
*********** CODE INSERTICN POINTS *****************
                                                                                181
                                                                          MAP
      CONTINUE
                                                                                182
                                                                          MAP
                                                                                183
 179 CONTINUE
184
                                                                                185
     WRITE (ISOUT.20) XGZ.YGZ
                                                                           MAP
                                                                                136
                                                                           MAP
 1702 IF(LEFT-NX) 1021,1022,1022
                                                                                187
                                                                          MAP
                                                                                188
 1021 NX=LEFT
 1022 MM=NX/(INC)
                                                                           MAP
                                                                                189
      M=MM+1
                                                                           MAP
                                                                                190
      LEFT IS USED HERE AS THE NUMBER OF PRINT COLUMNS IN THE LAST
C
                                                                           MAP
                                                                                191
      PRINTER STRIP
                                                                           MAP
                                                                                192
                                                                           MAP
      LEFT=NX-HM* (INC)
                                                                                193
                                                                          MAP
      IF (LEFT.NE.0) GO TC 2023
                                                                                194
                                                                           MAP
                                                                                195
      M = MM
      LEFT = INC
                                                                           MAP
                                                                                196
      STRIPS
                                                                           MAP
                                                                                197
 2023 DO 110 ISTRIP=1.H
                                                                           MAP
                                                                                198
                                                                           MAP
      MAPRUN=MAPRUN+1
                                                                                199
                       GO TO 1023
                                                                           MAP
                                                                                200
      IF (JC
               •EQ.3)
                                                                           MAP
      ABSSA(1)=XCOORD
                                                                                2111
      DO 3323 IAB=2,16
                                                                           MAP
                                                                                202
 3023 ABSSA(IAB) = ABSSA(IAE-1)+TINC
                                                                           MAP
                                                                                213
      WRITE (ISOUT, 1) MAPRUM, CPMID, NREQ
                                                                           MAP
                                                                                204
      WRITE (ISOUT, 16) ABSSA
                                                                           MAP
                                                                                205
                                                                           MAP
 1023 KL=KKL+(NYMAP-1)*NXMAP
                                                                                206
      IF (ISTRIF-M) 103, 104, 103
                                                                           MAP
                                                                                217
      KINC=LEFT-1
                                                                           MAP
                                                                                248
      VLEFT=LEFT
                                                                           MAP
                                                                                249
      XCIN=VLEFT + DGX
                                                                           MAP
                                                                                210
                                                                           MAP
      GO TO 1031
                                                                                211
                                                                           MAP
      KINC=INC-1
                                                                                212
      XCIN=XCINC
                                                                           MAP
                                                                                213
 1931 CONTINUE
                                                                           MAP
                                                                                214
                                                                           MAP
      KLINK = KINC+1
                                                                                215
      IF (JC
              .EQ.3) WRITE (MBT APE) NYMAF, KLINK
                                                                           MAP
                                                                                216
                                                                           MAP
C
                                                                                217
                                                                           MAP
С
      ROWS
                                                                                218
      YY=YMIN+DGY*FLOAT(NYMAP)
                                                                           MAP
                                                                                219
      DU 200 J=1,NYHAP
                                                                           MAP
                                                                                220
      KH=KL+KING
                                                                           MAP
                                                                                221
      KDC=0
                                                                           MAP
                                                                                222
                                                                           MAP
      DO 201 K=KL,KH
                                                                                223
      IF (OMAP(K).LT.CUTHAF)OMAP(K)=0.0
                                                                           MAP
                                                                                224
 201
      FSUM=FSUM+OMAP(K)
                                                                           MAP
                                                                                225
                                                                           MAP
                                                                                226
C
C
      NUMBERS WITHIN ROWS
                                                                           MAP
                                                                                227
      DO 300 K=KL,KH
                                                                           MAP
                                                                                 228
      KDG=KDC+1
                                                                           MAP
                                                                                 229
      TRANSFER TO CODE FOR SELECTED PRESENTATION
¢
                                                                           MAP
                                                                                230
      GO TO N2, (150, 151, 301)
                                                                           MAF
                                                                                231
                                                                           MAP
                                                                                232
C 150 CODE FOR POWER OF TEN DISPLAY
                                                                           MAP
                                                                                233
 150
      IF(OMAP(K))105,106,107
                                                                           MAP
                                                                                234
      ASSIGN 121 TO N3
                                                                           MAP
                                                                                235
      OMAP(K) =-OMAP(K)
                                                                           MAP
                                                                                236
                                                                           MAP
      GO TO 109
                                                                                237
      ASSIGN 300 TO N3
 107
                                                                           MAP
                                                                                238
  109 H = ALOG10(ONAP(K))
                                                                           MAP
                                                                                239
      H1=AMOD(H,1.0)
                                                                           MAP
                                                                                240
```

	JMAP(KDC)=H-H1	MAP	241
	IF (JMAP (KDC) . EQ . 0) JMAP (KDC) = 0	MAP	242
	FMTEXP(KDC+1) = FMTI	MAP	243
	FNTRUT(KDC+1) = FMTF	MAP	244
	IF (JMAP(KDC) .NE.0)GO TO 1090	HAP	245
	JMAP(KDC)=D	MAP	246
	FMTEXP(KDC+1) = FMTA	MAP	247
1090	OMAP(K) = 10.0++H1	MAP	248
	IF (OMAP(K) -9.999) 115,115,1091	MAP	249
1091	OMAP(K) = OMAP(K) /10.0	MAP	250
	JMAP(KDC)=JMAP(KDC)+1	MAP	251
	FMTEXP(KDC+1) = FMTI	MAP	252
	GO TO 115	MAP	253
106	JMAP(KDC)=B	MAP	254
	OMAP(K)=0.0	MAP	255
	FMTEXP(KDC+1) = FMTA	MAP	256
	FMTRUT(KDC+1) = FMTA	MAP	257
	GO TO 30U	MAP	258
115	GO TO N3,(300,121)	MAP	259
C 121	RESET SIGN OF MAP CCCRDINATE	MAP	260
121	OMAP(K)=-OMAP(K)	MAP	261
	GO TO 300	MAP	262
C		MAP	263
C 151	CODE FOR TWO-LINE F11.3 DISPLAY	MAP	264
151	JMAP(KDC)=GMAP(K)/10.0	MAP	265
	ZMA P=JM AP (KDC)	MAP	266
	OMAP(K)=OMAP(K)-(ZMAP*10.0)	MAP	267
	FMTEXP(KDC+1)= FMTI	MAP	268
	FMTRUT(KDC+1) = FMTF	MAP	269
	FMTEXP(KOC+1) =FMTA	MAP	270
	FMTRUT(KUC+1)=FMTA	MAP	271
300	CONTINUE	MAP	272
	WRITE(ISOUT,2) (JMAF(K),K=1,KDC)	MAP	273
	WRITE(ISOUT,4)YY, (OMAP(K), K=KL, KH)	MAP	274
	YY≈YY-DGY	MAP	275
	GO TO 290	MAP	276
301	WRITE (MBTAPE) (OMAP(K),K=KL,KH)	MAP	277
200	KL=KL-NXHAP	MAP	278
	IF (JC .EQ.3) GO TO 110	MAP	279
	HRITE (ISOUT, 16) ABSSA	MAP	280
	XCOORD=XCOORD+XCIN	MAP	261
110	KKL=KKL+INC	MAP	282
111	RETURN	MAP	283 284
	ENO	MAP	4 04

```
*DECK, OPMEX
                                                                            OPMEX
      SUBROUTINE OPMEX (NUMTAP)
                                                                            OPMEX
                                                                            OPMEX
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                            OPMEX
                                                                            OPMEX
                        OLIPUT PROCESSOR MODULE * * * * *
                                                                            OPMEX
                                                                                   6
                                                                            UPMEX
                            !#**#### GLOSSARY **#########
                                                                           OPMEX
                                                                            OPME X
C
      CAYF
                         ACTIVITY K FACTOR USED FOR AIRBURSTS AND
                                                                            OPMEX 10
                         ARBITRARY PARTICLE SIZE-ACTIVITY DISTRIBUTIONS. OPMEX 11
                         (R-M**2)/(HR-KT)
                                                                            OPMEX 12
Ċ
                         ACTIVITY DECAY FACTOR (NREQ= 5,6)
                                                                            OPMEX 13
C
      CUTMAP
                         CUT-OFF THRESHOLD FOR MAP ORDINATE VALUES
                                                                            UPMEX 14
Ç
      DELTAX
                         MAXIMUM WIDTH OF A CURE-LOAD MAP
                                                                            OPMEX 15
      DETID( )
                         ICRM IDENTIFICATION
                                                                            OPMEX 16
                         MAP GRID POINT SEPARATION DISTANCES IN THE
                                                                            OPMEX 17
      DGX . DGY
C
                         X AND Y DIRECTIONS
                                                                            OPMEX 18
                         PARTICLE SIZE CLASS UPPER BOUNDARY DIAMETERS (M) OPMEX 19
C
      DIAM(I)
C
                         (CALLEC PACT IN PAM)
                                                                            OPMEX 20
Ç
      OTMID()
                         DTF IDENTIFICATION
                                                                            OPMEX 21
                         FALLOUT MASS FRACTION IN EACH FARTICLE SIZE
      FMASS(I)
                                                                            OPMEX 22
                         CLASS FOR A LCGNURMAL SIZE DISTBN. FOR AN
                                                                            OPMEX 23
                         ARRITRARY SIZE-ACTIVITY DISTRN. IT IS THE
                                                                            UPMEX 24
Ċ
                         ACTIVITY FRACTION IN EACH PARTICLE SIZE CLASS.
                                                                            UPMEX 25
C
      FP(I)
                         TOTAL RADIOACTIVITY IN EACH SIZE CLASS
                                                                            UPMEX 26
C
      FSUM
                         SUM OF ALL MAP POINT ORDINATES
                                                                            OPMEX 27
¢
                         FISSION YIELD (KT)
      FW
                                                                            OPMEX 28
C
      GRUFF
                         A COMBINED GROUND ROUGHNESS AND RABIATION METER OPMEX
                                                                                  29
                         RESPONSE FACTOR (DEFAULT VALUE=0.5)
C
                                                                            OPHEX
                                                                                  30
                                                                            OPMEX 31
C
      IC(J)
                                 CONTROL VARIABLES
                         RUN
        IC(1 ).GT.8
                         NC MAPS ARE TO BE PRODUCED
                                                                            OPMEX 32
C
        IC(2 ).GT.L
                         PRINT CONTENTS OF TAPE IPOUT
С
                                                                            OPMEX 33
C
      ICTR
                         SEE GOGO GLOSSARY
                                                                            OPHEX 34
      IGO (LOGICAL)
                         T COMPUTE ACTIVITY. F COMPUTE ATOMIC ABUNDANCES OPMEX 35
C
      THOB
                         .GT. C INDICATES AN AIRBURST
                                                                            OPMEX 36
С
                         PRINTER DESCRIPTION -- NUMBER OF CHARCTERS/INCH
                                                                            OPMEX 37
      ΙH
C
                         ACFOSS A PAGE OF PRINTED OUTPUT (IH=10)
                                                                            UPMEX 38
C
                         PRINTER DESCRIPTION -- NUMBER OF CHARCTERS/INCH
      IV
                                                                            OPMEX 39
C
                                 A PAGE OF PRINTED OUTPUT (IV=6)
                                                                            OPHEX 40
                         NUMBER OF MAP ORDINATE COLUMNS THAT CAN BE
                                                                            OPMEX 41
      INC
                         ACCOMOCATED BY THE PRINTER PAPER
C
                                                                            UPHEX 42
                         PAP INFUT DATA TAPE
C
      INPAM
                                                                            OPMEX 43
C
      IPNCH
                         SYSTEM PUNCH TAPE
                                                                            OPMEX 44
C
      IPGUT
                         DTF BINARY CUTPUT TAPE. CONTAINS FALLOUT PARCELOPMEX 45
C
                         DATA FOR USE BY THE OPM
                                                                            OPMEX 46
      ISOUT
                         SYSTEM OUTPUT TAPE NUMBER
                                                                            OPMEX 47
C
C
      ISIN
                         SYSTEM INPUT TAPE NUMBER
                                                                            OPMEX 48
C
      IRROR
                         EFFCR STOP TRACE WORD
                                                                            OPHEX 49
                         MAP FRINT FORMAT CONTROL
                                                                            UPHEX 50
C
      JC
                         2 LINE E FORMAT (THIS IS USED ON INPUT DEFAULT)
C
        JC=1
                                                                            UPMEX 51
                                                                            OPHEX
C
        JC=2
                         2 LINE F11.3 FCRMAT
                                                                                  52
C
      JD (LOGICAL)
                         T COMPLTE EXPOSURE RATE, F COMPUTE DOSE
                                                                            OPMEX 53
                                                                            OPHEX 54
                         PAM CONTROL PARAMETER
C
      JGO
                         COMPUTE DISTBN WITH PART. SIZE OF ALL FISS. PRODS. OPMEX 55
C
                         CCMPUTE DISTBN WITH PART.SIZE CF CNE MASS CHAIN OPMEX 56
C
                  2
C
                         COMPUTE INDUCED ACTIVITY ONLY
                                                                            OPMEX 57
                  3
                                                                            OPHEX 58
      KDOS (LOGICAL)
                         T COMPLTE COSE FROM TIMES TENTER TO TEXIT
С
                         F COMPUTE DOSE FROM TIMES TENTER TO INFINITY
                                                                            UPHEX 59
C
      KTR(I)
                         SEE PCHECK GLOSSARY
                                                                            UPMEX 60
```

```
FALLOUT PARCEL DATA ARRAYS DIMENSION
C
      MARRAY
                                                                            OPMEX 61
      MASCHN
                         MASS CHAIN NUMBER FOR A NREQ=14 REQUEST
                                                                            OPMEX 62
C
                         MULTIBURST OUTPUT TAPE
      MBT APE
                                                                            OPMEX 63
С
      MXREQ
                         MAXIMUM NUMBER OF PROCESSING REQUEST TYPES
                                                                            OPMEX 64
                         NUMBER OF PARTICLE SIZE CLASSES (CALLED ITAB IN OPMEX 65
      NOSTR
                         PAM)
                                                                            OPMEX 66
C
                         SEE PCHECK GLOSSARY
      NE
                                                                            UPMEX 67
C
      NIJ
                         PARCEL BLOCK COUNT
                                                                            OPMEX 68
C
                         MAXIMUM NUMBER OF MAP POINTS IN A MAP CORE LUADOPMEX 69
      NMA P
C
                         SMALLEST X INDEX OF A MAP POINT TO THE RIGHT OF OPMEX 70
      NOL
C
                                  BOUNDARY OF THE CONTRIBUTION ELLIPSE
                         THE LEFT
                                                                            OPMEX 71
                         OF A PARCEL
C
                                                                            OPMEX 72
                         LARGEST X INDEX OF A MAP POINT TO THE LEFT OF OPMEX 73
Ç
      NOR
                         THE RIGHT BOUNDARY OF THE CONTRIBUTION ELLIPSE
С
                                                                            OPMEX 74
                         OF A PARCEL
                                                                            OPMEX 75
      NORD
                         ROUTING PARAMETER FOR FARCEL CONTRIBUTIONS
                                                                            OPMEX 76
                         AT MAP POINTS - -
                                                                            OPMEX 77
C
                              1 - PARCEL COUNT (NREQ=1)
                                                                            OPMEX 78
C
                              2 - STRAIGHTFORWARD ADDITION OF THE
                                                                            OPMEX 79
C
                                   GAUSSIAN DISTRIBUTE C QUANTITY TO EACH
                                                                            OPMEX 80
C
                                   MAP POINT (NREQ=2-14)
                                                                            OPMEX 01
C
                              3 - TIME OF ONSET (NREQ=15)
                                                                            OPMEX 82
C
                                  TIME OF CESSATION (NREQ=16)
                                                                            UPMEX 83
C
                                  SMALLEST PARTICLE SIZE (NREQ=17)
                                                                            OPMEX 84
C
                              6 - LARGEST PARTICLE SIZE (NREQ=16)
                                                                            OPMEX 05
C
      NOX
                         TOTAL NUMBER OF MAP POINTS ON THE X AXIS.
                                                                            UPMEX 86
C
                         INCLUDING ALL CORE LCAES
                                                                            OPMEX 87
С
                         COMPUTATION OPTION CODE
      NREQ
                                                                            OPMEX 88
C
                         A COUNTER FOR MAP REQUESTS
      NRQ
                                                                            OPMEX 89
                         TALLY OF PARTICLE DATA BLOCKS
                                                                            OPMEX 90
C
      NST
                         A TALLY OF MAP SPECIFICATIONS
      NTASK
                                                                            UPMEX 91
      NUMTAP( )
                         TAFE NUMBER ARRAY
                                                                            OPMEX 92
C
                         NUMBER OF MAP POINTS ON THE X AXIS IN A MAP COREOPHEX 93
      NXMAP
C
                                                                            OPMEX 94
C
                         NUMBER OF MAP FOINTS ON THE Y AXIS IN A MAF COREOPMEX 95
      NYMAP
C
                         LCAD
                                                                            OPMEX 96
С
                         NUMBER OF MAP CORE LOACS REQUIRED IN ADDITION TOUPMEX 97
      NZ
C
                                                                            OPMEX 38
                         THE FIRST
C
      (L) 9 AMO
                         THE MAP ORDINATE ARRAY
                                                                            OPMEX 99
C
      OPMID( )
                         OUTPUT PROCESSOR IDENTIFICATION
                                                                            OPHEX130
C
      PS(I)
                         PARTICLE SIZE CLASS CENTRAL DIAMETERS (M)
                                                                            OPMEX1J1
                         CUT-OFF THRESHOLD FOR AN INDIVIDUAL DEPOSIT
С
      CCUI
                                                                            OPMEX1J2
C
                         INCREMENT CONTRIBUTION
                                                                            OPMEX1J3
C
      SLDTMP
                         SCIL SOLIDIFICATION TEMPERATURE (CEG. K) (FROM CRYOPMEX134
      TEXIT
C
                         TIME RELATIVE TO SHOT TIME CORRESPONDING TO T2
                                                                            OPMEX105
                         TIME RELATIVE TO SHOT TIME CURRESPONDING TO T1
C
      TIME, TENTER
                                                                            OPMEX1J6
      TMSD
                         TIME OF SOIL SCLIDIFICATION ( FROM CRM ) (SEC)
                                                                            OPMEX1 17
                         RECUEST TIME ARGUMENTS OF PARTICLE SIZES
      T1, T2
                                                                            OPMEX108
C
                         TOTAL EXPLOSION ENERGY YIELD (KT)
                                                                            OPMEX139
C
      WFMAS(I)
                         TOTAL MASS OF FALLOUT IN EACH PARTIGLE SIZE
                                                                            OPMEX110
                         CLASS/ GRUFF FCR A LOGNORMAL FARTICLE DISTBN.
C
                                                                            OPMEX111
                         ACTIVITY FRACTION IN EACH SIZE CLASS/GRUFF FOR
C
                                                                            OPMEX112
C
                         AN ARBITRARY PARTICLE SIZE-ACTIVITY DISTRIBUTION UPHEX 113
                         FALLOUT PARCEL DESCRIPTION DATA (ALL INDEXED)
      XPAR, YPAR, ZPAR,
                                                                            OPMEX114
        TPAR, SIGXO, SIGYO,
                                                                            OPMEX115
        RO.PSIZ.PHAS
                                                                            OPHEX116
      XMAX, XMIN
                         MAXIMUM AND MINIMUM X COORDINATES OF THE MAP
                                                                            OPMEX117
                         MAXIMUM AND MINIMUM Y COORDINATES OF THE MAP
C
      YMAX, YMIN
                                                                            OPMEX118
                         X AXIS BOUNDRY COORDINATES OF THE CURRENT MAP
C
      X1.X2
                                                                            UPMEX119
                         CCRE LOAD
                                                                            OPME X120
```

```
ZMIN
                           DEPOSITION PLANE ALTITUDE (M RELATIVE TO MSL)
                                                                                 OPMEX12%
C
      ZSCL
                           SCALED HEIGHT OF BURST (FT/W**(1.0/3.4))
                                                                                 OPME X122
C
                                                                                 UPMEX123
C
                                                                                OPMEX124
C
                                                                                 OPMEX125
                                                                   , I POUT
                                                                                , OPMEX126
      COMMON /CONDAT/
                                           ,IHOB
                                                       , IPACH
                               IC(20)
                                           ,KPOUT
                                                                                , OPMEX127
                  , ISOUT
                              ,JPOUT
                                                       KTAPE
     1 ISIN
                                                                   .LTAPE
                                           ,SD
                                                       , INPAM
                              . HXREQ
     2 MARRAY
                  .MBTAPE
                                                                                 OPMEX128
      COMMON /MAPDAT/ CAYF , CUTHAP
                                           . DGX
                                                                                , OPMEX129
                                                       , DGY
                                                                   ,IH ,IV
                  - NXHAP
                              . NY MAP
                                           , NZ
                                                       , OCUT
                                                                   .SSAM
                                                                                , OPMEX130
                                                                                , OPMEX131
                                                                    ,XMAX
     ZTGZ
                  , XGZ
                              , X.
                                           , X2
                                                       , YGZ
                              MINT
                  , YHAX
                                           ZHIN
     3 XMIN
                                                                                 OPMEX132
      DIMENSION NUMTAP (15) . UMAP (
                                                                                 OPMEX133
                                      5380)
                NMAP
                              MARRAY
                                             MXREQ
                                                         ΙH
                                                                 IV
                                                                                 OPMEX134
      UATA
                                                                                 OPMEX135
                5000
                               100
                                              18
                                                         10
                                                                  6
C
                                                                                 OPMEX136
      ISIN =NUNTAP( 1)
                                                                                 OPNEX137
       ISOUT=NUMTAP(
                                                                                 UPMEX138
                                                                                 OPMEX139
       IPOUT=NUMTAP( 3)
       JPOUT=NUMTAP( 5)
                                                                                 OPMEX140
       KPOUT=NUMTAP( 6)
                                                                                 OPMEX141
       IPNCH=NUMTAP( 7)
                                                                                 OPMEX142
                                                                                 OPMEX143
       MBTAPE=NUMTAP(8)
       INPAH=NUMTAP( 9)
                                                                                 UPMEX144
                                                                                 OPMEX145
      CALL
                   OPH1
                   OPM2 (OMAP, NMAP)
                                                                                 OPMEX146
       CALL
                                                                                 OPMEX147
       RETURN
                                                                                 OPMEX148
      END
```

```
OPM1
*DECK . OPM1
      SUBROUTINE OPM1 (NUMTAP)
                                                                               OPM1
                                                                               OPM1
                                                                               OPMI
C
      H. G. NORMENT. ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
C
                                                                               UPM1
                                                                               OPM1
C*
C
                                                                               OPM1
                                                                                       7
      THIS PROGRAM INITIALIZES AND WRITES HEADINGS FOR THE OUTPUT
                                                                               UPM1
C
C
      PROCESSOR. THEN IT CALLS THE FIRST PART OF THE FARTICLE ACTIVITY OPM1
                                                                                       9
C
      MODULE (PAM1 OR PAM1A) TO PRECOMPUTE DATA USED BY THE SECOND PART OPM1
                                                                                      10
C
      OF THE PARTICLE ACTIVITY MODULE WHICH IS CALLED BY OPM2,
                                                                               OPM1
                                                                                      11
                                                                               OPH1
C
                                                                                      12
C
      PAM1 IS USED FOR CASES WHERE THE FIREBALL INTERSECTS THE GROUND
                                                                               OPM1
                                                                                      13
C
      AND PARTICLE SIZE DISTRIBUTION IS LOGNORMAL.
                                                          PAMIA IS USED FOR
                                                                               OPM1
                                                                                      14
       AIRBURSTS AND FOR ARBITRARY PARTICLE SIZE-ACTIVITY DISTRIBUTIONS. OPM1
                                                                                      15
                                                                               UPM1
                                                                                      16
                                                                              +OPM1
C
                                                                                      17
                                                                               OPM1
                                                                                      18
C
                                                                  .IPOUT
      COMMON /CONDAT/
                              IC(20)
                                          ,IHOB
                                                      . IP NCH
                                                                              , OPM1
                                                                                      19
                  .ISOUT
                              . JPOUT
                                          , KPOUT
                                                                              , OPM1
     1ISIN
                                                      .KTAPE
                                                                  .LTAPE
                              , HXREQ
                                          •SD
                                                      , IN FAM
     2 MARRAY
                  . MBTAPE
                                                                               OPM1
                                                                                      21
      COMMON /MAPDAT/ CAYF ,CUTHAP
                                                      DG Y
                                                                              , OPM1
                                          ,DGX
                                                                  ,IH ,IV
                                                                                      22
                  . NXHAP
                              ,NYMAP
                                                      , QCUT
                                                                  *SSAM
                                                                              , UPM1
                                                                                      23
     1 JC
                                          , NZ
                                                                              , OPM1
     2TGZ
                  , XGZ
                                          , X2
                                                      • YGZ
                                                                  *XMAX
                                                                                      24
                              ,X1
                  , YMAX
                              ,YHIN
                                                                                      25
     3XMIN
                                          .ZHIN
                                                                               OPM1
                                                                              . OPM1
                                          .3SQ
                                                      .COSA
      COMMON /PARDAT/
                               ASQ
                                                                                      26
                              ,PMAS(100) ,PSIZ(100) ,RO(100)
                                                                  ,SIGXO(100), 0PK1
     1 GAMA
```

```
,TPAR(100) ,XPAR(100) ,YPAR(100) ,YPRML
                                                                             . OPM1
     2SIGYO(100), SINA
                                                                              OPM1
                                                                                    29
     3YPRMU
                 ,ZPAR (100)
                                                     , FSUF
      COMMON /RUNDAT/
                                         ,CF6
                                                                 .ICTR
                                                                             , OPM1
                                                                                    30
                                         , NOR D
                                                                             , OPM1
                             ,NIJ
                                                                 ,NTASK
                                                                                    31
     1 MAPRUN
                 • NE
                                         , WFHAS (200)
                                                                              UPM1
                                                                                    32
     20PMID(12) ,T1
                             T2
      COMMON /FISHIN/ ABEGN(700), ABUNDO(700), BRANCH(130), CAPFIS,
                                                                              OP M1
                                                                                    33
        DCON(700), IBRA, INUC, MAXNUC, MULT(11), NUCLID (7 00)
                                                                              OPM1
                                                                                    34
                                                                              UP M1
                                                                                    35
      COMMON /OUTPUT/ FISHEM, FF(200), FW, NDSTR, JGC, MASCHN, PS(200),
     1 FMASS(200), DIAM(200)
                                                                              OPM1
                                                                                    36
      COMMON /UTILTY/ KCUT, NPRNT (15)
                                                                              OPM1
                                                                                    37
      INTEGER FISSID
                                                                              OPM1
                                                                                     38
                                                                              OPM1
                                                                                    39
      LOGICAL NPRNT
                                                                              UPM1
      DIMENSION DETID(12), DTMID(12), NUMTAP(15)
                                                                                    40
                                                                              OPM1
                                                                                     41
      DATA PROGRM /6H CPM1 /
                                                                              OP M1
                                                                                     42
C
                                                                              OPM1
                                                                                     43
      FORMAT(12A6)
      FORMAT(8L1)
                                                                              OPM1
                                                                                     44
                                                                              OPM1
                                                                                     45
      FORMAT (A6,4X, 2F10.3)
    5 FORMAT(/ 30 x, 51HU238 INCUCED ACTIVITY - CAPTURE-TO-FISSION RATIC OPM1
                                                                                     46
                                                                                     47
     1 ISF 7.3)
    6 FORMAT ( / 30X, 56 HSOIL INCUGED ACTIVITY - NEUTRONS EMITTED PER FISSOPM1
                                                                                     48
                                                                                     49
     1ION AREF7.3)
    7 FORMAT ( /47X19HTYPE OF FISSION IS A6)
                                                                                     50
    8 FORMAT ( /21X55HTHE CLOUC REACHED THE SOIL CONDENSATION TEMPERATUROPM1
                                                                                     51
     1E OF F7.1,4H AT F8.4,5H SEC.
                                                                              OPM1
                                                                                     52
    9 FORMAT (/ 43X14HTOTAL YIELD IS, 1PE12.4, 10H KILCTCNS.,
                                                                              OPM1
                                                                                     53
                                                                                     54
                                                                              UP M1
                /41x16HFYSSION YIELD 1S,1PE12.4,10H KILCTUNS.)
      FORMAT(// 41x, 33H**** SUMMARY OF RUN ICENTIFIERS ****/ 41x,
                                                                              GP M1
                                                                                     55
 10
     1 19HOUTPUT PROCESSOR - 12A6,/ 28X, 32HINITIALIZATION AND CLOUD RISUPM1
                                                                                     56
     2E - 12A6/ 38X, 22HDIFFUSIVE TRANSPORT - 12A6)
                                                                              OPM1
                                                                                     57
                                                                                     58
 15
      FORMAT(2014)
      FORMAT(/22X77H****
                            THE CONTROL VARIABLE ARRAY, IC(J), WAS GIVEN TOPM1
                                                                                     59
     THE FOLLOWING VALUES ****/ 19X, 2014)
                                                                              OPM1
 17
      FORMAT ( /45X9HTHERE ARE, I4, 17H PARTICLE CLASSES)
                                                                              OPM1
                                                                                     61
                                                                              UP M1
      FORMAT ( /41%. 22H*HE HEIGHT OF BURST IS , F9.3, 8H METERS. )
                                                                                     62
 18
      FORMATI /39X43HPRINTER DESCRIPTION - CHARACTERS PER INCH/
                                                                              UP M1
                                                                                     63
 21
                                                                              OPM1
                                                                                     64
              42X, 10 M DEIZCHTALIS, 10X, 10HVERTICAL I3)
      FORMATI 15X, 4647AR, 8X,4HYPAR, 8X, 4HZPAR, 8X, 4HTPAR,
                                                                              OPM1
                                                                                     65
 26
     1 5HSIGXO, 7X, 5HSIGYO, 8X, 2HRO, 9X, 4HPSIZ, 8X, 4HPMAS//)
FORMAT( 1H1, 50X, 19H* * * * * * * * * *//55X,11HD E L F I C//
                                                                              UPM1
                                                                                     66
                                                                              OPM1
                                                                                     67
 28
                                                                  D E P A R TOPM1
                                                  12X1C1HT H E
                                                                                     68
     1
                       DEFENSE FALLOUT PREDICTIOOPM1
     2 M E N T
                  0 F
                                                                                     69
            S Y S T E M, // 51x, 19H* + + + + + + + + + + // / 48x, 23HUUTPUT PROOPM1
                                                                                     7 U
     4CESSOR MODULE///55X,11HPREPARED EY/45X,30HATMUSPHERIC SCIENCE ASSOUPM1
                                                                                     71
                                                                              UPM1
     5CIATES/ 53X, 14HBEDFCRD, MASS.)
                                                                                     72
      FORMAT(////45X38HLISTING OF FALLOUT PARCEL DESCRIPTIONS)
                                                                                     73
                                                                              OPM1
 29
                                                                              OPM1
                                                                                     74
      FORMAT(//13X6HBLOCK 14)
 30
                                                                              UPM1
                                                                                     75
      FORMAT(10X, 9E12.4)
 36
       FORMAT(1)X. 43HNUMBER OF FALLOUT PARCELS IN THIS BLOCK IS 14)
                                                                              OPM1
                                                                                     76
 37
                                                                              UPM1
       FORMAT(46H NO MAPS. THIS RUN FOR TAPE IFOUT PRINT ONLY.)
                                                                                     77
 39
   40 FORMAT( //25X. 63HTHIS IS AN AIRBURST. PARTICLE ACTIVITIES ARE COPM1
                                                                                     78
      10MPUTED BY PAMA / 30X, 11HSCALED HOB=E12.5, 7H (FEET))
                                                                              OPM1
                                                                                     79
       FORMAT( /4JX, 42HSOIL INDUCED ACTIVITY IS NOT ACCOUNTED FOR)
                                                                              OPM1
                                                                                     à G
 41
       FORMAT(1HO, 11X, 53 FFISSION YIELD IS ACJUSTED BY THE FRACTION-DOWOPM1
                                                                                     21
 42
      in FactorF8.5, 16H FCR SCALED HUB=1PE11.4, 13H FT W**(-1/3))
                                                                              UPM1
                                                                                     32
                                                                              OPM1
                                                                                     83
C
       NTASK=0
                                                                              OPM1
                                                                                     04
                                                                              OPM1
                                                                                     85
       KOUT=ISOUT
                                                                              OPM1
                                                                                     86
       DO 50 I=1.200
                                                                              UPM1
                                                                                     87
   50 PS(I) = 0.0
```

```
OPM1
COMMENCE READING IPOUT HEACER DATA
                                                                                     88
                                                                               0F51
                                                                                     89
      READ (IPOUT) FW, SSAM, SLDTMP, TMSO, SD, W, HE IGHT, RHCF, RADMAX, ZMIN
      READ (I POUT) XGZ. YGZ. 1GZ
                                                                               OPM1
                                                                                     90
                                                                               GPM1
      READ
             (IPOUT) (DETID(J), J=1,12)
                                                                                     91
                                                                               OPH1
             (IPOUT) (DTMID(J).J=1.12)
                                                                                     92
      READ
                                                                               OPM1
                                                                                     93
      READ
             (IPOUT) NOSTR
                                                                               OPM1
             (IPOUT) (PS(J), SIAM(J), FMASS(J), J=1, NOSTR)
                                                                                     94
      READ
                                                                               OPM1
                                                                                     95
CONVERT HEIGHT IN METERS TO HOB IN FEET
      HOB=HEI GHT/.3048
                                                                               OPM1
                                                                                     96
                                                                               OPM1
                                                                                     97
COMMENCE READING CARD INPUT
                                                                               OPM1
                                                                                     98
      READ (ISIN.1) OPHID
                                                                               OPM1
      READ (ISIN, 15) IC
                                                                                     99
                                                                               OPM1 130
      PEAD (IS IN. 3) NPRNT(6). NPRNT(7). (NPRNT(I).I=9.13). NPRNT(15)
                                                                               OPM1
      READ(ISIN, 4) FISSID, EMITN, CAPFIS
                                                                                    1 1 1.
COPY OUT HEADER AND CRITICAL DATA
                                                                               OPM1
                                                                                    102
      WRITE (ISOUT, 28)
                                                                               OPM1
                                                                                    103
      WRITE (ISOUT, 10) OPHID. DETID. DTHID
                                                                               OPM1 134
                                                                               OPM1 105
      WRITE (ISOUT, 16) IC
                                                                               OPM1 1J6
      WRITE (ISOUT, 9) W.FW
                                                                               OPM1 197
      WRITE (ISOUT,7)FISSID
                                                                               OPM1 108
      WRITE (ISOUT, 18) HEIGHT
                                                                               OPM1 109
CHECK SCALED HOB TO SEE IF THIS IS AN AIRBURST
                                                                               OPM1 110
      IHOB=D
                                                                               OPH1 111
      ZSCL=H0B/W**(1.0/3.4)
                                                                               OPM1 112
      IF(ZSCL .GE. 180.) IHOB=1
                                                                               OPH1 113
       IF(IHOB .GT. 0) GO TO 75
COMPUTE FRACTION-DOWN ADJUSTMENT FACTUR FOR FISSION YIELD
                                                                               UPM1 114
                                                                               OPM1 115
      IF(ZSCL .LE. 0.0) GC TO 60
       ZSCM = HOB/W++(0.33333333333)
                                                                               OPM1 116
                                                                               OPM1 117
      FD = (0.45345) + + (ZSCH/65.0)
                                                                               OPM1 118
       WRITE(ISOUT, 42) FD, ZSCM
                                                                               OPM1 119
      FW=FW*FO
   60 IF(SD .LE. 0.0) GO TO 75
                                                                               OPM1 120
                                                                               UPM1 121
      IF(CAPFIS .GT. 0.0) WRITE(ISOUT, 5) CAPFIS
                                                                               OPM1 122
       IF( EMITH .GT. 0.0) WRITE(ISOUT,6) EMITH
                                                                               OPM1 123
       IF (EMITH . EQ. 0. u) WRITE (ISOUT, 41)
                                                                               OPM1 124
       WRITE (ISOUT.8) SLOTMP. TMSO
                                                                               OPM1 125
   75 WRITE(ISOUT,17) NDSTR
                                                                               OPM1 126
  100 WRITE (ISOUT, 21) IH, IV
                                                                               OPM1 127
       IF(IC(2))501,501,500
                                                                               OPM1 128
COPY OUT CONTENTS OF TAPE IPOUT
                                                                               OPM1 129
  500 \, \text{NST} = 0
                                                                               OPM1 130
       WRITE (ISOUT, 29)
                                                                               OPM1 131
  600 READ (IPOUT) NIJ
                                                                               OPM1 132
       NST=NST+1
       IF(NIJ) 503,501,504
                                                                               OPM1 133
                                                                               OPM1 134
  503 CALL ERROR (PROGRM, - 503, ISOUT)
                                                                               UPM1 135
  504 READ(IPOUT)(XPAR(I), YPAR(I), ZPAR(I), TPAR(I), SIGXO(I), SIGYO(I),
                                                                               OPM1 136
     1 RO(I), PSIZ(I), PMAS(I), I=1, NIJ)
                                                                               OPM1 137
       WRITE (ISOUT, 30) NST
                                                                               OPM1 138
       WRITE (ISOUT, 37) NIJ
                                                                               OPM1 139
       WRITE (ISOUT, 26)
       WRITE(ISOUT, 36) (XPAR(I), YPAR(I), ZPAR(I), TPAR(I), SIGXC(I), SIGYC(I), OPM1 140
                                                                               OPM1 141
      1 RO(I), PSIZ(I), PMAS(1), I=1, NIJ)
                                                                               OPM1 142
       GO TU 600
                                                                               OPM1 143
  501 REWIND IPOUT
               A POSITIVE VALUE TERMINATES RUN WITHOUT PAM OR MAP CALCS. OPM1 144
CHECK IC(1).
       TF(IC(1) .LE. 0) GO TO 511
                                                                               OPM1 145
                                                                               OPM1 146
  510 WRITE (ISOUT, 39)
                                                                               OPM1 147
       CALL EXIT
```

```
511 IF(IHOB .EQ. 0) IF(S0)515,515,520
                                                                             OPM1 149
      WRITE( ISOUT, 49 ) ZSCL
                                                                             OPM1 150
  515 CALL PAMIA(FISSID)
                                                                             OPM1 151
                                                                             OPM1 152
      RETURN
  520 CALL PAM1
                                                                             OPM1 153
                  .SLOTMP .THSC
          ( HO B
                                    . W .EMITN, FISSID )
                                                                             OPM1 154
      RETURN
                                                                             UPM1 155
      CNB
                                                                             UPM1 156
*DECK, OPM2
                                                                             UPH2
      SUBROUTINE OPH2 (OMAF. NIAP)
                                                                             OPH2
C
                                                                             UPMZ
                                                                                     3
C
      H. G. NORMENT. ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1978
                                                                             OPM2
C
                                                                             OPHZ
                                                                            SHAD
C
                                                                             UPM2
C
      SECONG HALF OF THE CLTPU1 PROCESSOR
                                                                             UPM2
      THIS SUBROUTINE INITIALIZES AND CONTROLS FOR MAF CALCULATIONS
C
                                                                             OPM2
                                                                             OPMZ
                                                                                   10
C
                                                                           ** UPM2
                                                                                   11
C
                                                                             OPH2
                                                                                   12
                                         ,IHOB
                                                    . IP NCH
      COMMON /CONDAT/
                             IC (25)
                                                                , I POUT
                                                                            , OPH2
                                                                                   13
                 , ISOUT
                             ,JPOUT
                                                    ,KTAFE
                                                                            , OPH2
                                         *KPOUT
                                                                .LTAPE
     1ISIN
                                                                                   14
                             . MXREQ
                                        , SD
     2 MARRAY
                                                    . IN FAP
                                                                             OP M2
                                                                                   15
                 . MRTAPE
      COMMON /MAPDAT/ CAYF , CUTMAP
                                                    DG Y
                                                                .IH .IV
                                                                            . OPH2
                                         . DGX
                                                                                   16
                             , NY MAP
                 , NX MAP
                                         ,NZ
                                                    .QCUT
     1 JC
                                                                .SSAM
                                                                            . UPM2
                                                                                   17
                 , XGZ
                             ,X1
                                         , X2
                                                    , YGZ
     2 TGZ
                                                                            . OPM2
                                                                                   18
                                                                ,XMAX
                                         .ZMIN
     3 XMIN
                 , YMAX
                             ,YMIN
                                                                             OPM2
                                                                                   19
      COMMON /RUNDAT/
                             C
                                         •CF6
                                                    •FSUM
                                                                , IUTR
                                                                            , UP MZ
                                                                                    20
               ◆ NE
                                         . NORD
                                                                            , UPMZ
     1 MAPRUN
                             , NIJ
                                                    . NR EG
                                                                .NTASK
                                                                                   21
                             , T 2
                                                                             UPM2
     17. (11)CIMPOS
                                         .WFMAS (2JO)
                                                                                   22
      COMMON /DECAY / IGC, JC, KDCS, TENTER, TEXIT, TIME
                                                                             UPMZ
                                                                                   23
      COMMON /OUTPUT/ FISh(M,FP(20c),Fh,NDSTR,JGC,MASCHN,PS(20c),
                                                                             OPM2
                                                                                   24
     1 FMASS(200),DIAM(200)
                                                                             UPMZ
                                                                                   25
      COMMON /UTILTY/ KCUT, NPRNT (15)
                                                                             UP112
                                                                                   26
                                                                             SM40
      LOGICAL IGO, JD, KDOS, NPRNT
                                                                                   27
      DIMENSION CONTUR(8), OMAP(NMAP)
                                                                             uPM2
                                                                                   28
                                / ,PROGRM/ 6H CPM2 /, NUL/C/
                                                                             OPM2
      DATA BLANK/1CH
                                                                                    29
      DATA QCUTA, CUTMPA/0.0001, J.J1 /
                                                                             UPM2
                                                                             OPM2
C
                                                                                    31
      FORMAT (//15x, 23HSUM OF MAP URDINATES = E13.6 )
                                                                             UPMS
 2
                                                                                    32
      FORMAT(1H1////54X,11+* * * * * *)
                                                                             UPM2
                                                                                    33
      FORMAT(// 15X, 52HCC)BINED GROUND ROUGHNESS-INSTRUMENT RESPONSE FAOPM2
                                                                                    34
     1CTORF10.3, 5X, 14HALTITUDE OF GZF10.3,17H METERS ABOVE MSL)
                                                                                    35
 9
      FORMAT(7F12.3)
                                                                                    36
 17
      FORMAT(32H OUTPUT PRCCESSING IS COMPLETED.)
                                                                                    37
      FORMAT(1H1///39X27H#### OUTPUT FROCESSOR TASKI5,6H ####)
 23
                                                                             OPM2
                                                                                    38
      FORMAT(///15X25HGRID LIMITS AND INTERVALS/20X4HXMIN18X4HXMAX1JX4HYUPM2
                                                                                    39
     1MIN1DX4HYMAX16X7HDELTA X.8X7HDELTA Y/15XF1G.U, 4XF1O.C.,4XF1J.C.,4XF1OPM2
                                                                                    +0
     20.1,5XF13.2,5XF10.2)
                                                                             UPMZ
                                                                                    41
                                                                             DPM2
 32
      FORMAT (415. 4F10.0)
                                                                                    42
                                                                             SM40
      FORMAT(25HJUNACCEPTABLE REQUEST ... 14)
                                                                                    43
 33
      FORMAT(////15X,15HREQUEST NUMBER I+///15X8HMAP TYPEI3,10X5HT1 = F10PM2
                                                                                    44
     13.2,10X,5HT2 = F10.2,19X,9HMASCHN = I4// 15X,6HGCUT= ,L12.5,10X,6HOPM2
                                                                                    45
     2CUTMAP= .E12.5)
                                                                                    46
```

UPM1 148

```
FORMAT (//25X, 19HMASCHN SET EQUAL TOIS)
                                                                              UP M2
 41
                                                                                     47
      FORMAT( 8F10.3/A10)
                                                                              CPH2
 44
                                                                                     48
      FORMATI/ 15%, 93 CCATOURS ARE NOT DETERMINED BECAUSE THE REQUESTED OPM2
 45
                                                                                     49
     1 MAP EXCEEDS ALLOCATED CORE STURAGE CAPACITY)
                                                                              OPM2
                                                                                     50
      FORMAT(/15X, 56HTHE SPECIFIED MAF GRID INCREMENTS FRODUCE DISTORTEUPH2
 46
                                                                                     51
                                                                              OPK2
     10 MAPS)
                                                                                     52
      FORMAT(/15x, 66HUNDISTORTED MAPS ARE PRODUCED BY THE GRID INCREMENOPMS
                                                                                     53
 47
                                                                              UPM2
     1TS PRINTED ABOVE)
                                                                                     54
C
                                                                              OP M2
                                                                                     55
      IGO = . TRUE.
                                                                              CPM2
                                                                                     56
                                                                              OPMZ
C
                                                                                     57
COPY IN MAP LIMITING COORDINATES, GRID INTERVALS, AND COMBINED GROUND
                                                                              OPH2
                                                                                     58
                                                                              OPM2
      ROUGHNESS-SURVEY INSTRUMENT RESPONSE FACTOR.
                                                                                     59
 1191 READ(ISIN, 9) XMIN, XMAX, YMIN, YMAX, CGX, OGY, GRUFF
                                                                              UPM2
                                                                                     60
                                                                               UPH2
      IF(GRUFF .EQ. J. 0) GRUFF=1.0
                                                                                     61
                                                                               OPM2
 1603 IF (ABS(DGX) + ABS(DGY)) 120,123,121
                                                                                     €2
 128 WRITE (ISOUT, 17)
                                                                               OPM2
                                                                                     63
      PEWIND IPOUT
                                                                               OPM2
                                                                                     64
      RETURN
                                                                              SM40
                                                                               UP#2
C
                                                                                     66
COMMENCE PROCESSING FOR MAFS OF THIS DESCRIPTION
                                                                              OPM2
                                                                                     67
                                                                              UPM2
  121 NTASK=NTASK+1
                                                                                     68
                                                                              OPM2
      FSUM=0.0
                                                                                     69
                                                                              OPM2
                                                                                     7 5
                                                                              UPM2
      NRQ =0
                                                                                     71
CALCULATE ADJUSTED HAP GRID INCREMENTS TO ASSURE AN UNCISTORTED MAP
                                                                               CPMZ
                                                                                     72
      NSP=1
                                                                               UPM2
                                                                                     73
      IF (DGY .GT. 0.6) GO TO 1300
                                                                               UPH2
                                                                                     74
      DGY=DGX*IH/IV/2.3
                                                                               OPM2
                                                                                     75
 1300 IF(DGX .EQ. 2.0*IV*DGY/IH) NSP=0
                                                                               UPMZ
                                                                                     76
CALCULATE NUMBER OF MAP CORE LOADS BEYOND THE FIRST, NZ.
                                                                               GPM2
                                                                                     77
                                                                               0PM2
                                                                                     78
      NZ = 3
                                                                               UPM2
      NYMAP = (YMAX - YMIN)/CGY
                                                                                     79
                                                                              OPM2
      NOX = (XMAX-XMIN) / DGX
                                                                                     80
      NXMAP=NOX
                                                                               UPM2
                                                                                     61
      NST = NMAP/NYMAP
                                                                              UPM2
                                                                                     ٤2
      IF(NXMAP .LE. NST) GC TO 1401
                                                                               UPM2
                                                                                     83
                                                                              UPM2
      NXMAP=NST
                                                                                     Ö4
                                                                              OPM2
 1400 IF(NXMAP .LE. 0) CALL ERROR(PROGRM.-14.0.ISOUT)
                                                                                     c 5
      NZ= NOX/NXMAP
                                                                               OPM2
                                                                                     c 6
                                                                               UPM2
 1401 NO 1121 J=1, NDSTR
                                                                                     97
      WFMAS(J)=FMASS(J)/GRUFF
                                                                               OPM2
                                                                                     88
                                                                               OPM2
       IF(SD .GT. C.D) WFMAS(J)=WFMAS(J)*SSAM
                                                                                     59
 1121 CONTINUE
                                                                               SM90
                                                                                     ÷ j
                                                                               OPM2
                                                                                     91
COFY OUT A LOCAL HEADING
                                                                               2440
                                                                                     92
       WRITE (ISOUT, 23) NTASK
       WRITE (ISOUT, 24) XMIN, XPAY, YMIN, YPAX, DGX, CGY
                                                                               OPM2
                                                                                     93
       WRITE (ISOUT, 4) GRUFF , ZMIN
                                                                               OPM2
                                                                                     -14
       IF(NSP)1123,1123,1122
                                                                               OPM2
                                                                                     95
 1122 WRITE (ISOUT, 46)
                                                                               OPMZ
                                                                                      96
       GO TO 1211
                                                                               UPM2
                                                                                     37
                                                                               JPM2
 1123 WRITE(ISOUT,47)
                                                                                     38
                                                                               0PM2
                                                                                     و د
                                                                               OPM2 130
 1211 CONTINUE
                                                                               PM2 111
C
 1269 IF (FSUM .NE. 0.0) WHITE (ISOUT, 2) FSUM
                                                                               UPM2 1.2
                                                                               OPM2 1:3
      IF(N7 .GT. 0) NXMAF=NST
COPY IN A MAP REQUEST
                                                                               OPM2 1.4
       READ(ISIN. 32) NREQ, JC, ICONT, MASCHN, T1, T2, GCUT, CUTMAP
                                                                               UPM2 1:5
       IF(ICONT .NE. 0) READ(ISIN,44 ) CONTUR,CROLBL
                                                                               OPM2 1.6
```

```
IF(ICONT .GT. 1) IFNCH=-1
                                                                         UPM2 107
      IF(JC . EQ. 0) JC=1
                                                                         OPM2 138
CHECK REQUEST SPECIFICATIONS AND SET DEFAULT VALUES FOR QUUT AND CUTMAP OPM2 119
      IF(NREQ .EQ. 0) GO TC 1191
                                                                         OPM2 110
 1213 IF(NREQ .LE. HXREQ) GC TO 4JO
                                                                         OPM2 111
      IRQOR=1213
                                                                         OPM2 112
 403 WRITE(JSOUT, 33) NREQ
                                                                         UPM2 113
      CALL ERROR(PROGRM, IRROR, ISGUT)
                                                                         UPM2 114
      GO TO 1211
                                                                         UPM2 115
 400 IF(QCUT .GT. 0.0) GC TO 500
                                                                         OPM2 116
                                                                         OPM2 117
      IF(NREQ .NE. 14) GO TO 402
      IF(T1 .GT. 0.0) GO TO 404
                                                                         OPM2 118
      QCUT = QCUTA+2.08E13
                                                                         OPM2 119
      GO TO 500
                                                                         UPM2 123
 404 QCUT = QCUTA+1.CE-4
                                                                         OPM2 121
      GO TO 500
                                                                         OPM2 122
  462 IF(NREQ .LT. 2 .OR. NREQ .GT. 1) ) GO TO 411
                                                                         UPM2 123
      QCUT=QCUTA
                                                                         OPM2 124
      IF(NREQ .EQ. 3 .AND. T1 .GT. 1.03 QCUT=QCUT+T1++(-1.26)
                                                                         OPM2 125
     IF(NREQ .GE. 5 .AND. NREQ .LE. 10 .AND. T1 .GT. 1.0)QCUT=QCUT*
                                                                         UPM2 126
    1 3.846*T1**(-0.26)
                                                                         UPM2 127
      IF ( (NREQ.EQ. 6 .OR. NREQ .EQ. 7 .OR. NREQ .EQ. 16) .AND. (T1.GT. 1.8 UPM2 128
         *AND. T2 *NE. 0.0)) QCUT = QCUT *(1.0-(T1/T2)**(0.26))
                                                                         OPM2 129
      GO TO 500
                                                                         UPM2 130
  401 QCUT=QCUTA+SSAM/(7.DE9+GRUFF+FW)
                                                                         OPM2 131
  500 IF(CUTMAP .GT. 0.0) GO TO 600
                                                                         OPM2 132
      IF(NREQ .NE. 14) GO TO 502
                                                                         OPM2 133
      IF(T1 .GT. 0.0) GO TC 593
                                                                         OPM2 134
                                                                         JPM2 135
      CUTMAP=CUTMPA* 2. GBE 13
      GO TO 600
                                                                         OPH2 136
  503 CUTMAP=CUTMPA+1.0E-4
                                                                         OPM2 137
      GO TO 600
                                                                         UPM2 138
  502 IF(NREQ .LT. 2 .OR. NREQ .GT. 10 ) GO TO 501
                                                                         OPM2 139
      CUTMAP=CUTMPA
                                                                         UPM2 143
      IF(NREQ .EQ. 3 .AND. T1 .GT. 1.0) CUTM AP=CUTMAP*T1**(-1.26)
                                                                         UPM2 141
      IF(NREQ .GE. 5 .ANC. NREQ .LE. 10 .AND. T1 .GT. 1.0)CUTMAP=CUTMAP+OPM2 142
     1 3.846*T1**(-0.26)
                                                                         OFM2 143
      IF((NREQ.EQ. 6 .OR. NREQ .EQ. 7 .OR. NREQ .EG. 10).AND.(T1.GT. 1.8UPM2 144
         •AND• T2 •NE• U•0))CUTMAP=CUTMAP*(1.6-(T1/F2)**(0.26))
                                                                         UPM2 145
      GO TO 600
                                                                         OPM2 146
  501 CUTMAP=CUTMPA+SSAM/(7.0E9+GRUFF+FW)
                                                                         OPM2 147
  600 IF(IHOB .EQ. 0 .ANC. SD .GT. 0.0) IF(NREQ-14)1210,69J,1210
                                                                         GPM2 148
  601 IF(NREQ .NE. 9 .ANC. NREQ .NE. 10 .AND. NREQ. NE. 14)GO TO 121) OPM2 149
      IRROR= 601
                                                                         OPM2 150
      GO TO 403
                                                                         OPM2 151
  690 IF(MASCHN.GT.71.AND.MASCHN.LT.162)GO TO 1210
                                                                         OPM2 152
      WRITE(ISOUT, 33) NREQ
                                                                         OPM2 153
      CALL ERROR (PROGRM, 690, ISOUT)
                                                                          OPM2 154
      MASCHN=95
                                                                         OPM. 155
      WRITE (ISOUT. 41) MASCHN
                                                                         UPM2 156
                                                                         OPM2 157
COMMENCE PROCESSING FOR THIS MAP REQUEST
                                                                         UPM2 158
CLEAR OUT THE OMAP ARRAY
 1210 CLROT=0.9
                                                                         OPM2 159
      UPM2 1ED
                                                                         OPM2 161
      DO 935 I=1, NMAP
  935 OMAP(I) = CLROT
                                                                         OPM2 162
COPY PAST IPOUT HEADER DATA TO POSITION TAPE AT START OF PARCEL DATA
                                                                         OPM2 163
      REWIND IPOUT
                                                                         UPM2 164
                                                                         UPM2 165
      00 1214 I=1.6
 1214 READ(IPOUT)
                                                                         UPM2 156
```

```
NRQ=NRQ+1
                                                                          OPM2 167
      IF(NRQ .NE. 1) MRITE(ISOUT.3)
                                                                          OPM2 168
      WRITE (ISOUT, 34) NRQ, NREQ, T1, T2, MASCHN, QCUT, CUTHAP
                                                                          OPM2 169
      IF(ICONT .NE. D .ANC. NZ .GT. D) WRITE(ISOU7,45)
                                                                          OPM2 170
                                                                          OPM2 171
      MAPRUN= C
                                                                          OPM2 172
      FSUM = J.O
      JG0=1
                                                                          CPM2 173
                                                                          OPM2 174
      JD= , TRUE.
      KDOS=.FALSE.
                                                                          OPM2 175
      FISNUM=FW*1.45E15
                                                                          OPM2 176
      NORD=1
                                                                          OPM2 177
     C=1.0
                                                                          OPM2 178
      CF6=1.7
                                                                          OPM2 179
      IF(NREQ .EQ. 9 .OR. NREQ .EQ. 10) NPRNT(15)=.TRUE.
                                                                          OPM2 180
      IF(NREQ .NE. 13 .AND. NREQ .NE. 4) GO TO 980
                                                                          OPM2 181
      T1=T1+1.7E-6
                                                                          JPM2 182
                                                                          OPM2 183
      T2=T2#1.JE-6
      GO TO 985
                                                                          OPM2 184
  980 T1=T1+3660. + TGZ
                                                                          OPM2 185
                                                                          OPM2 186
      T2=T2+3610. + TGZ
      TIME=T1-TGZ
                                                                          OPM2 187
      TENTER=TIME
                                                                          OPM2 188
      TEXIT=T2-TGZ
                                                                          OPM2 189
      NREQ - 10 2. 3. 4. 5. 6. 7. 0. 9.10.11.12.13.14.15.16.17.18
C
                                                                          OPM2 190
  985 GO TO (9u,7u,79,70,69,68,73,78,78,73,81,60,8u,71,8u,60,8u,80,80).NREQUPM2 191
      CF6=CF6+(1.0 - (TIME/TEXIT)++(0.26))
                                                                          OPM2 192
 68
 69
      GF6=32.3344*GF6* (TIME)** (-0.26)
                                                                          OPM2 193
70
      TIME=3600.0
                                                                          OPM2 194
      GO TO 79
                                                                          OPM2 195
                                                                          OPM2 196
71
      JG0 = 2
      FISNUM=FISNUM+1-E+4
                                                                          QPM2 197
      IF( IHOB .GT. 6 ) CALL ERROR( PROGRM, -71, ISCUT )
                                                                          OPM2 198
      GO TO 791
                                                                          OPM2 199
 73
      KDOS=.TRUE.
                                                                          UPM2 230
      JO= .FALSE.
 78
                                                                          OPM2 231
      FISNUM=FISNUM/3690.
                                                                          OPM2 202
                                                                          OPM2 213
 79
      CONTINUE
      IF( JHOB .EQ. G .ANC. SD .GT. J.D ) GO TO 790
                                                                          OPM2 204
      CALL AMZA
                                                                          OPM2 205
                                                                          OPM2 206
      GO TO 8 1
 790
      CALL PAM2
                                                                          OPM2 217
      NORD=NORD+1
                                                                          UPM2 218
 90
      NORD=MAX3(NORD, NORD+NREQ-14)
                                                                          OPH2 219
C
                                                                          OPM2 210
                          C
C
                                                                          OPM2 212
      X1=XYIN
                                                                          OPM2 213
      X2=X1+NXMAP*DGY
                                                                          OPM2 214
                                                                          OPM2 215
      ICTR=0
                                                                          OPM2 216
      IF(NZ)203,204,207
  203 CALL ERROR (PROGRM, -2(3, ISOUT)
                                                                          OPM2 217
                                                                          OPH2 218
COMPUTE A SINGLE CORE-LOAD MAP
  204 KTAPE=IPOUT
                                                                          OPM2 219
      CALL GOGO(OMAP, NMAP)
                                                                          UPH2 220
                                                                          OPM2 221
      REWIND KTAPE
      IF((NREQ.NE.15).ANC.(NREQ.NE.17)) GO TO 305
                                                                          UPM2 222
      00 302 IMAP=1.NMAP
                                                                          OPM2 223
      IF (OMAP (IMAP) . GE. 1. E30) OMAP (IMAP) = 0.0
                                                                          OPM2 224
                                                                          OPM2 225
  3G2 CONTINUE
  305 IF(ICONT .NE. 0 .AND. CROLUL .NE. BLANK) CALL CONTOR (CONTUR, CROLBL, OPM2 226
```

4	OWAR NUARA	0040	
1	L OMAP, NMAP)	OPM2	
	CALL MAP (OMAP, NMAP)	SMAO	
0.0404	GO TO 1211	OPM2	
	FE A MULTIPLE CORE-LCAD MAP	OPM2	
207	REWIND JPOUT	SMAO	
	REWIND KPOUT	3M90	
	KTAPE=%POUT	OPM2	
	LTAPE=JPOUT	OPMZ	
	GALL GOGU(OMAP, NMAP)	OPM2	235
	REWIND KTAPE	OPM/2	236
	HRITE(LTAPE)NUL	OPM2	237
	REWIND LTAPE	UPM2	238
	IF((NREQ.NE.15).AND.(NREQ.NE.17)) GO TO 308	UPMS	239
	00 306 IMAP=1,NMAP	OPMZ	240
	IF(OMAP(IMAP).GE.1.E30) OMAP(IMAP)=G.0	SM40	241
306	CONTINUE	0P M2	242
308	CALL MAP(OMAP, NMAP)	OPM2	243
	00 220 INDEX=1,NZ	UP M2	244
CLEAR	OUT THE OMAP ARRAY	OPM2	
	CLROT=0.3	UP M2	
	IF((NREQ.EQ.15).OR.(NREQ.EQ.17)) CLROT=1.E30	0PH2	247
	DO 702 IMAP=1.NMAP	OPM2	
702	OMAP(IMAP)=CLROT	OPM2	
. • -	IF(MOD(INDEX,2).EQ.1) GO TO 208	0P M2	
	KTAPE=KPOUT	UPH2	251
	LTAPE=JPOUT	OPM2	
	GO TO 209	OPM2	
208	KTAPE=JPOUT	UP M2	_
•••	LTAPE=KPOUT	0PM2	
209	ICTR=INDEX	UPM2	
	IF(INDEX .EQ. NZ) NXMAP=NOX - NZ*NXMAP	UPM2	
	X1=X2	UPM2	
	X2=X1+NXMAP*OGX	OPM2	
211	CALL GOGO(OMAP, NMAP)	OPM2	
	REWIND KTAPE	UPM2	
	WRITE (LTAPE) NUL	0PM2	
	REWIND LTAPE	0PM2	
	IF((NREQ.NE.15).ANC.(NREQ.NE.17)) GU TO 220	0PM2	
	00 215 IHAP=1.NMAP	UPM2	
	IF (OMAP (IMAP) .GE.1.E3G) OMAP (IMAP) = 0.0	UPM2	_
24 %	CONTINUE	0PM2	
	CALL MAP (OMAP, NMAP)	0PM2	_
221	GO TO 1211	UPM2	
	END	–	
	LNU	UPM2	2 / U

```
+D ECK. PAMIA
                                                                           PAM1A
      SUBROUTINE PAMIA (FISSID)
                                                                            PAM1A
                                                                                   2
                                                                            PAM1A
C
      H. G. NURMENT, ATMOSPHERIC SCIENCE ASSOCIATES - JANUARY 1979
                                                                            PAM1A
                                                                                   L
                                                                            PAM1A
                                                                                   5
                                                                                   6
C
                                                                                   7
C
      PART 1 OF THE AIRBURST AND USER SPECIFIED SIZE-ACTIVITY PARTICLE
C
                                                                                   9
C
      ACTIVITY MODULE
                                                                            PAM1A
                                                                            PAMIA 10
O
      MATCHES THE FISSION TYPE INDICATOR, FISSIO, WITH THE STORED TABLEPAMIA 11
C
      OF TYPES AND STORES THE ACTIVITY K FACTOR (R-+**2)/(HR-KT)
                                                                            FAM1A 12
      IN GAYF.
                                                                            PAMIA 13
                                                                            PAM1A
                                                                           PPAMIA 15
                                                                            PAMIA 16
                                        ,DGX
                                                   , DG Y
                                                                           , PAM1A 17
      COMMON /MAPDAT/ CAYF +CUTMAP
                                                               ,IH ,IV
                NXMAP
                            NYMAP
                                        , NZ
                                                   , GC UT
     1.JC
                                                               SSAM
                                                                           , PAMIA 18
                • XG 7.
                            ,X1
                                        ,X2
                                                                           , PAM1A 19
     ETGZ
                                                   · YGZ
                                                               *X MAX
                            ,YHIN
                                                                            PAMIA 20
     SXMIN
                 XAMY
                                        ,ZMIN
                                                                            PAM1A 21
      COMMON /UTILTY/ KOUT.NPRNT (15)
      INTEGER FISSIO, FISTP
                                                                            PAMIA 22
      LOGICAL MPRNT
                                                                            PAMIA 23
      DIMENSION FISTP( 7), FK( 7)
                                                                            PAM1A 24
                                                                            PAMIA 25
      DATA PRUGRH / 6HPAMAB1 /
      DATA FISTP
                                                                            PAMIA 26
     1/ 63U233NE,6HP239HE,6HP239FI,6HU235HE,6HU235FI,6HU238TN,6HU238HE /PAM1A 27
      DATA
             FΚ
     1/ 6.3010E9.6.0830E9.6.9733E9.7.2911E9.7.8643E9.7.9407E9.8.2111E9 /PAM1A 29
                                                                            PAMIA 30
 1100 FORMAT(///10X, 45HFISSID DOES NOT MATCH WITH ANY AVAILABLE TYPE)
                                                                            PAMIA 31
C
                                                                            PAMIA 32
                                                                            PAMLA 33
      00 19U I=1.7
      IF (FISSIO .EQ. FISTP(I)) GO TO 200
                                                                            PAMIA 34
                                                                            PAHIA 35
  103 CONTINUE
      WRITE ( KOUT ,1180 )
                                                                            PAMIA 36
      CALL ERROR( PROGRM, -100, KOUT)
                                                                            PAMIA 37
  200 \text{ CAYF} = FK(I)
                                                                            PAMIA 36
      RETURN
                                                                            PAMIA 39
                                                                            PANIA 48
      END
```

THE REPORT OF THE PROPERTY OF

```
PAN2A
*DECK PAM2A
      SUBROUTINE PAHZA
                                                                             PAMZA
C
                                                                             PAMZA
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - DECEMBER 1976
C
                                                                             PAM2A
                                                                                     5
                                                                             PAM2A
                                                                           4* PAMZA
                                                                                     6
C
C
                                                                             PAMZA
      PART 2 OF THE AIRBURST AND USER SPECIFIEC SIZE-ACTIVITY PARTICLE
C
                                                                             PAMZA
                                                                                     ಕ
                                                                             PAM2A
C
      ACTIVITY MODULE
C
                                                                             PAM2A id
      COMPUTES THE PARTICLE ACTIVITY-SIZE ARRAY FP().
                                                             FP(I) CCNSISTS PAM2A 11
C
C
      OF THE EXPOSURE RATE, FOR ACTIVITY CUNCENTRATED IN ONE SQUARE
                                                                             PAMZA 12
C
      METER OF GROUND SURFACE, ASSOCIATED WITH PARTICLES OF THE ITH
                                                                             PAMZA 13
C
                                                                             PAM2A 14
      SIZE CLASS.
C
                                                                             PAMZA 15
                    (LOGICAL) TRUE-COMPUTE EXPOSURE RATE AT TIME TIME
C
                                                                             PAMZA 16
                              FALSE-COMPUTE DOSE
Ç
                                                                             PAMZA 17
                    (LOGICAL) TRUE-COMPUTE DOSE FROM TIME TENTER TO TEXITPAMZA 18
C
      KDOS
                              FALSE-COMPUTE DOSE FROM TIME TENTER TO INF. PAMEA 19
C
                    ACTIVITY K FACTOR (R-M**2/HR-KT)
                                                                             PAMZA 20
C
      CAYF
                                                                             PAMZA 21
C
                                                                           ** PAM2A 22
C
                                                                             PAMZA 23
      COMMON /DECAY/ IGO, JC, KDOS, TENTER, TEXIT, TIME
                                                                             PAMZA 24
                                                    . DG Y
      COMMON /MAPDAT/ CAYF , CUTHAP
                                         • DGX
                                                                ,IH ,IV
                                                                            ,PAMZA 25
                                                                ,SSAM
                                                                            ,PAMZA 26
                                                     , QC UT
     1.30
                 , NXMAP
                             , NYMAP
                                         , NZ
                                                                            , PAMZA 27
                             ,X1
                                         ,X2
                                                                *XMAX
                 , XGZ
      767
                                                     , YGZ
     XMIN
                 ,YMAX
                             ,YMIN
                                         ,ZMI N
                                                                             PAMZA 28
      COMMON /OUTPUT/ FISHUM, FF(200), FW, ITAB, JGO, MASCHN, PSIZE(201),
                                                                             PAMZA 29
                                                                             PAMZA 30
     1 FMASS(230),PACT(200)
      COMMON JUTILTY/ KCLT, NPRNT (15)
                                                                             PAMZA 31
      LOGICAL IGO, JD, KDOS, NPRNT
                                                                             PAMZA 32
 1000 FORMAT( 1H1, 5X, 53HTABLE OF TOTAL ACTIVITY IN EACH PARTICLE SIZE PAM2A
                                                                                    33
     1CLASS -// 4(6X, 5HPSIZE, 10X, 2HFP, 5X))
                                                                             PAM2A 34
                                                                             PAMZA 35
 2000 FORMAT( 8(1PE14.4))
 3000 FORMAT( 1HC,13X, 11HK FACTORS -, 10X, 1P£11.4,
                                                                             PAMZA 36
     1 17H (R-M**2)/(HR-KT), 10X, 1PE11.4, 18H (R-MI**2)/(HR-KT))
                                                                             PAM2A 37
                                                                             PAMZA 33
      A = CAYF + FW
                                                                             PAMZA 39
      IF( JD ) GO TO 100
                                                                             PAMZA 40
      A = 32.3344 + A / TENTER**(0.26)
                                                                             PAMZA 41
      IF( KDOS ) A = A+(1.0 - (TENTER/TEXIT)++(0.26))
                                                                             SAMZA 42
                                                                             P'M2A 43
      GO TO 201
                                                                             PAMZA 44
  100 IF( TIME .EQ. 3600. ) GO TO 200
       A = A + (3600./TIME)**(1.26)
                                                                             PAMZA 45
  200 CONTINUE
                                                                             PAMZA 46
      DO 370 I=1.ITAB
                                                                             PAMZA 47
                                                                             PAMZA 48
  300 \text{ FP(I)} = A + \text{FMASS(I)}
               NPRNT (151) RETURN
                                                                             PAMZA 49
       TF(
                                                                             PAMZA 50
       NTAB=IT AB/4
       IF(NTAB *4 .LT. ITAB)NTAB=NTAB+1
                                                                             PAMZA 51
                                                                             FAMZA 52
       WRITE( KOUT , 1989 )
       WRITE (KOUT, 2000) (PSIZE(I), FP(I), PSIZE(I+NTAP), FP(I+NTAB),
                                                                             PAMZA 53
     1 PSIZE(I+2*NTAB), FF(I+2*NTAB), PSIZE(I+3*NTAB), FF(I+3*NTAB), I=1,
                                                                             PAMZA 54
                                                                             PAMZA 55
                                                                             PAMZA 56
       CAYFA = CAYF *3.861E-7
                                                                             PANZA 57
       WRITE(KOUT, 3000) CAYF , CAYFA
       RETURN
                                                                             PAMZA 58
       END
                                                                             HAMZA 59
```

```
PCHEC
*DECK, PCHECK
                                                                      PCHEC
                                                                             2
     SUBROUTINE PCHECK(IJIN, OMAP, NMAP)
                                                                      PCHEL
                                                                             3
                                                                      PCHEC
C
      H. G. NORMENT, ATMOSPHERIC SCIENCE ASSUCIATES - DECEMBER 1978
                                                                      PCHEC
          *PCHEC
                                                                      PCHEC
                                                                             7
     THIS SUBROUTINE DETERMINES THE TYPE OF MAP REQUESTED AND
                                                                      PCHEC
                                                                             8
                                                                             9
      IT INITIALIZES FOR THIS MAP. FOR EACH PARCEL IN THE DATA BLOCK
                                                                      PCHEC
      IT COMPUTES THE BOUNDRIES OF ITS CONTRIBUTION ELLIPSE AND
                                                                      PCHEC 10
      IT LABELS IT ACCORDING TO WHETHER IT WILL CONTRIBUTE TO
                                                                      PCHEC 11
                                                                      PCHEC 12
     SUBSEQUENT MAP CORE LOADS OR NOT. IF A FARCEL CONTRIBUTES TO
      THE CURRENT MAP CORE LOAC , SUBROUTINE CALC IS CALLED.
                                                                      PCHEC 13
                                                                      PCHEC 14
  -----
                                                                     * PCHEC
                                                                            15
                                                                      PCHEC
                                                                            16
      ***PCHEG 17
                                                                      PCHEC 18
                  PARTICLE SIZE CLASS INDEX
                                                                      PCHEC 19
C
                  INDICATES WHETHER OR NOT THE PARCEL IS TO BE
                                                                      PCHEC 20
C
      KTR(IP)
                  CONSICERED IN SUBSEQUENT MAP CORE LOADS - -
                                                                      PCHEC 21
C
                            0 - CONSICER PARCEL SUBSEQUENTLY
                                                                      PUHEC 22
С
                            1 - REJECT PARCEL
                                               FOR FURTHER USE
                                                                      PCHEC 23
                                                PARCEL CONTRIBUTION
C
      YPRMU
                  UPPER Y COCRDINATE LIMIT FOR
                                                                      PCHEC 24
                                                                      PCHEC 25
                  UPPER X CCORDINATE LIMIT FOR
                                                PARCEL CONTRIBUTION
      XPRMU
                                                PARCEL CONTRIBUTION
                                                                      PCHEC 26
                  LOWER X COORDINATE LIMIT FOR
      XPRNL
                                                PARCEL CONTRIBUTION
      YPRHL
                  LOWER Y COORDINATE LIMIT FOR
                                                                      PCHEC 27
C
                  SQUARE CF SEMI-AXIS A OF THE
                                                PARCEL CONTRIBUTION
                                                                      PCHEC 28
      ASQ
                                                                      PCHEC 29
                  LIMIT ELLIPSE
                  SQUARE OF SEMI AXIS B OF THE PARCEL CONTRIBUTION
                                                                      PCHEC 30
      BSQ
C
                  LIMIT ELLIPSE
                                                                      PCHEC 31
                                                                      PCHEC 32
                          CF THE ORIENTATION ANGLE OF THE A AXIS OF
C
      SINA
                  SIN
                       PARCEL CONTRIBUTION LIMIT ELLIPSE
                                                                      PCHEC 33
                  THE
                  COSINE OF THE ORIENTATION ANGLE OF THE A AXIS OF
                                                                      PCHEC 34
      COSA
                  THE PARCEL CONTRIBUTION LIMIT ELLIPSE
                                                                      PCHEC 35
                  LOG(BASE E) OF THE RATIO OF THE GAUSSIAN PARCEL
                                                                      PCHEC 36
      GAMA
                  CONTRIBUTION DISTRIBUTION MODE VALUE TO C \mathcal{R}^{\mathsf{T}}
                                                                      PCHEC 37
                                                                      PCHEC 38
                  COUNT OF AVAILABLE PARCEL STORAGE LOCA (
                                                               IN
                  CORE.
                          THIS IS THE NUMBER OF PARCELS
                                                                      PCHEC 39
                  IN PCHECK.
                                                                      PCHEC 40
                   A BLOCK COUNT OF DATA STORED ON TAPE AND JUR IN COKE
                                                                      PCHEC 41
                                                                      PCHEC 42
                   MAGNITUDE (I.E. INTEGRATED VALUE) OF A PARCEL
                  PROPERTY TO BE DISTRIBUTED ON THE MAP
                                                                      PCHEC 43
                                                                      PCHEC 44
      ALSO SEE OPM1 GLOSSARY
                                                                      PCHEC 45
                                                                      PCHEC 46
С
                                                              *********PCHEC 47
                                                                      PCHEC 48
                                                                     , POHEC 49
                                     , IHOB
                                                .IPNCH
                                                           , I POUT
      COMMON /CONDAT/
                           IC(2J)
                                                                      PCHEC 50
                .ISOUT
                           ,JPOUT
                                     ,KPOUT
                                                , KT APE
                                                           ,LTADE
     1 ISIN
                                                .INFAM
     2 MARRAY
                , MBTAPE
                           .MXREQ
                                     • SD
                                                                      PCHEC 51
                                                                      ,PCHEC 52
                                                , DG Y
                                                           ,IH ,IV
      COMMON /MAPDAT/ CAYF , CUTMAP
                                     o DG X
                                     , Y Z
                                                , QCUT
                                                           ,SSAH
                                                                      , PCHEC 53
                . NXMAP
                           , NY MAP
     1 JC
                                                                      , PCHEC 54
                , XGZ
                          ,X1
                                                , YGZ
                                                           ,XHAX
     2 TGZ
                                     , X2
                          ,YHIN
                                                                      PCHEC 55
                . YHAX
                                     .ZMIN
     3 XMIN
                                                           ۰F
                                                ,COSA
                                                                      ,PCHEC 56
      COMMON /PARDAT/
                           ASQ
                                     , 3SQ
                          ,PMAS(100) ,PSIZ(100) ,RO(190)
                                                           .SIGX0(180), PCHEC 57
                .KTR (100)
     1 GAMA
                                                                      ,PCHEC 58
                          ,TPAR(100) ,XPAR(1JC) ,YPAR(100) ,YPRML
     2SIGYO(103),SINA
                ,ZPAR(100)
                                                                      PCHEC 59
     3 YPRHU
                                                .FSUM
                                                           -ICTR
                                                                      .PCHEC 60
      COMMON /RUNDAT/
                                     ,CF6
```

```
, NE
                                       .NORD
                                                                         ,PCHEC 61
                            .KIJ
                                                  .NREG
                                                              .NTASK
     1 MAPRUN
     20PMID(12) ,T1
                            ,T2
                                       , WFMAS (230)
                                                                          PCHEC 62
      COMMON /DECAY/ IGO, JC, KD (S, TENTER, TEXIT, TIME
                                                                          PCHEC 63
      COMMON /OUTPUT/ FISHUM, FF(233), FW, NDSTF, JGC, MASCHN, PS(233),
                                                                          PCHEC 64
                                                                          PCHEC 65
     1 FMASS(2J0),DIAM(200)
      DIMENSION OMAP (NMAP)
                                                                          FCHEC 66
      LOGICAL IGO.JD.KDOS
                                                                          PCHEC 67
      PATA PROGRAZEHPCHECKZ
                                                                          PCHEC 68
C
                                                                          PCHEC 69
                                                                          PCHEC 78
      NF=1
      IF( IJIN.EQ.0) GO TO 50
                                                                          PCHEC 71
      J=1
                                                                          PCHEC 72
                                                                          PCHEC 73
      D=NILI
                                                                          PCHEC 74
      NDSTP1=NDSTR+1
   50 DO 777 IP=1.NIJ
                                                                          PCHEC 75
C
                                                                          PCHEC 76
                                                                          PCHEC 77
      DETERMINE IF THE DEFCSIT INCREMENT IS GROUNDED
C
C
                                                                          PCHEC 78
      IF ((7PAR(IP)-ZMIN).GT.10.0) GO TO 200
                                                                          PCHEC 79
      NREQ - 1, 2, 3, 4, 5, 6, 7, 6, 9, 10, 11, 12, 13, 14, 15, PCHEC 80
   75 GO TO(1)1.120.103.104.105.106.120.120.135.106.101.112.113.120.101.PCHEC 81
           7 )1, 101, 101), NFEQ
                                                                          PCHEC 82
С
      NREQ - 16, 17, 18
                                                                          PCHEC 83
                                                                          PCHEC 84
      COUNT OF GROUNDED WAFERS, OR MASS DEPUSITED, OR TIME OF ONSET
                                                                          PCHEC 85
                                                                          PCHEC 86
      OR CESSATION. OR SMALLEST OF LARGEST PARTICLE SIZE.
  101 F=PYAS(IP)
                                                                          PCHEC 87
      GO TO 100
                                                                          PCHEC 08
                                                                          PCHEC 59
C 103 DOSE RATE AT TIME TI SECONDS
                                                                          PCHEC 90
 103 IF(TPAR(IP) - T1)123,120,200
                                                                          PCHEC 91
C
                                                                          PCHEC 92
C 104 H+1 HR NORMALIZED DOSE RATE RESULTING FROM PARTICLES IN THE SIZE
                                                                          PCHEC 33
                                                                          PCHEC 94
      RANGE T1 TO T2 MIC FORETERS
  104 IF(PSIZ(IP) .GE. T1 .ANC. PSIZ(IP) .LE. T2) GC TO 120
                                                                          PCHEC 95
      GO TO 233
                                                                          PCHEC 96
                                                                          PCHEC 97
C 135.136 DOSE ACCUMULATED FROM TIMES T1 TO INFINITY OR T2.
                                                                          PCHEC 98
  10 E IF (TPAR (IP) .GE. T2) GO TO 210
                                                                          PCHEC 99
  105 IF (TPAR (IP) .GE. T1) GO TO 147
                                                                          PCHEC110
      TENTER=T1-TGZ
                                                                          PCHEC1J1
      C=CF6
                                                                          PCHEC132
                                                                          POHEC133
      GO TO 123
  107 TENTER=TPAR(IP)-TGZ
                                                                          PCHEC164
      IF(NREQ .EQ. 9 .OR. NREQ .EQ. 1J) GO TO 120
                                                                          PCHEC135
      C=32.3344* (TENTER) ** (-0.26)
                                                                          PCHEC136
      IF(NREQ .EQ. 6) C=C*(1.0 - (TENTER/TEXIT)**(1.26))
                                                                          PCHEC117
      GO TO 123
                                                                          PCHEC138
С
                                                                          POHEC109
C 112 TOTAL PARTICLE MASS (EPOSITED BETWEEN TIMES 11 AND 12 SECONDS
                                                                          PCHEU110
  112 IF (TPAR(IP) .GE. T1 .ANG. TPAR(IP) .LE. T2) GC TO 141
                                                                          PCHEC111
                                                                          PCHEC112
      CO TO 263
                                                                          PCHEC113
C
  113 MASS FROM PARTICLES IN THE SIZE RANGE T1 TO T2 MICROMETERS.
                                                                          PCHEC114
  113 IF(PSIZ(IP) .GE. T1 .ANC. PSIZ(IP) .Li. T2) GC TO 101
                                                                          PCHEC115
                                                                          PCHEC116
      GO TO 233
                                                                          PCHEC117
C
C 12G FIND INDEX OF PARTICLE SIZE CLASS
                                                                          PCHEC118
  120 IF(ICTR .NE. 0) GO TC 122
                                                                          FCHEC119
  121 IF(A3S(PSIZ(IP) - PS(J)) .LT. 1.JE-6) GO TO 125
                                                                          PCHEC120
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PCHEC121
      J=J+1
      IF(J.LE.NDSTR)GO TO 121
                                                                          PCHEC122
      CALL ERROR (PROGRM , -120, ISOUT)
                                                                          FCHEC123
                                                                          PCHEC124
 122 DO 123 I=1. NDSTR
        K=NDSTP1-I
                                                                          PCHEC115
      IF(DIAM(K) .GE. PSIZ(IP)) GO TO 12+
                                                                          PCHEC126
 123 CONTINUE
                                                                          FUHEL127
      CALL ERROR (PROGRM. - 123, ISOUT)
                                                                          PCHEU128
                                                                          FCHEU129
 124 J=K
 125 IF(NREQ .EQ. 9 .OR. NREQ .EQ. 13) CALL PAM2 IF(NREQ.NE.14)GO TO 130
                                                                          PCHEC13L
                                                                          PCHEC131
      F=FP( J )*PMAS(IP)/FMASS( J )/SSAM
                                                                          PCHEC132
      GO TO 100
                                                                          FCHEC133
  130 F=FP( J )*PMAS(IP)/WFMAS( J ) * C
                                                                          PCHEC134
                                                                          P JHEC135
                ****
                                                                   ++++++PUHEC136
                                                                          PCHEC117
C
  100 CONTINUE
                                                                          PCHEC138
C
                                                                          PUHEC1 19
      COMPUTE GAMA AND DETERMINE THE LIMITING COCKDINATES OF THE
C
                                                                          PUHEULAT
C
      PARTICLE CONTRIBUTION ELLIPSE
                                                                          PCHEL141
C
                                                                          PCHEC142
      IF(F.LT.QCUT) GO TO 200
                                                                          PCHEL143
      GAMA = ALOG(F/SIGXC(IP)/SIGYO(IP)/QCUT/6.28318531)
                                                                          PCHEC144
      IF(GAMA.LT.O.D) GO TO 200
                                                                          PCHEC145
      COSA=COS(RO(IP))
                                                                          PCHEC146
      SINA=SIN(RC(IP))
                                                                          PCHEC147
      ASQ= 2. 3*GAMA*SIGXO(IP) **2
                                                                          PCHEC148
      BSQ= 2.0+GAMA+SIGYO(IP) ++2
                                                                          PUHEL149
      YPRMU = YPAR(IP) + S(RT(ASQ#3INA+#2 + 8SQ+COSA+#2)
                                                                          PCHEC150
      YPRML = 2.0*YPAR(IF) - YPRMU
                                                                          PCHEC151
                                                                          PCHEC1:2
      DOES THE PARTICLE CONTRIBUTE TO THE MAP WITHIN ITS VERTICAL
                                                                          PCHEC153
C
      (Y AXIS) LIMITS -
                                                                          PCHEC154
                                                                          PCHEC: 55
C
      IF(YPRMU.GT.YNIN + CGY.AND.YPRML.LT.YMAX) GO TO 205
                                                                          PCHEC156
  200 KTR(IP)=1
                                                                          PCHEC157
      NE=NE+1
                                                                          PCHEC153
      GO TO 777
                                                                          FUHEU139
  205 XPRMU=XPAR(IP)+SQRT(ASQ*COSA**2 + 3SQ*SINA**2)
                                                                          fuheu 1ej
С
                                                                          +CHELLES
                                                                          PCHECILZ
      DOES THE PARTICLE CONTRIBUTION LIE COMPLETELY BEYOND THE LEFT
С
C
      BOUNDRY OF THIS MAP CORE LOAD -
                                                                          FJHEU163
C
                                                                          FC
                                                                          PC
      IF(XPRMU.LT.X1+DGX) GO TO 200
                                                                                 ιŝ
      XPRML = 2.0 + XPAR(IP) - XFRMU
                                                                          26
                                                                          PCHEU1
C
      DOES THE PARTICLE CONTRIBUTION LIE COMPLETELY BEYOND THE RIGHT
                                                                          PUHEL150
      BOUNDRY OF THIS MAP CORE LOAD -
                                                                          PUHEC104
C
                                                                          PCHEC170
      IF (XPRML.LT.X2) GO TC 220
                                                                           PCHEC171
      KTR(IP) = 0
                                                                          PJHEU172
      GO TO 777
                                                                          PCHEC174
С
      WILL THIS CONTRIBUTER ALSO CONTRIBUTE TO SUBSEQUENT MAP CORE LUACSPOHECA75
С
                                                                          PCHEC176
  22J IF(XPRMU.GT.X2) GO TO 230
                                                                          PCHEU177
      KTR(IP)=1
                                                                          FCHEC176
      NE=NE+1
                                                                          PCHEC179
      GO TO 240
                                                                          PCHEC150
```

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230 KTR(IP)=0
                                                                              PCHEC131
  240 CALL CALC(IP, OHAP, NHAP)
                                                                              PCHEC182
  777 CONTINUE
                                                                              PCHEC133
C
                                                                              PCHEC134
      METURN
                                                                              PCHEC185
C
                                                                              PCHE C186
                                                                              PCHEC187
      END
*DECK.PDNP
                                                                              POMP
                                                                              POMP
      SUBROUTINE PDMP
                                                                                      2
C
                                                                              PUMP
                                                                                      3
      THIS SURROUTINE SORTS OUT THOSE PARCELS THAT WILL CONTRIBUTE
C
                                                                              POMP
C
      TO SUBSEQUENT MAP CORE LOADS, AND DUMPS THEM ON TO TAPE FOR
                                                                              POMP
C
      TEMPORARY STORAGE
                                                                              POMP
                                                                                      6
                                                                              POMP
C
                                                                              POMP
      H.G.NORMENT
                        JUNE 28,1971
                                                                              POMP
C
                         ++ ++++++++++ GLOSSARY +++++++++
                                                                           4**PJMP
С
                                                                              POMP
                                                                                     11
C
                                                                              FOMP
                                                                                     12
                    COUNT OF PARCELS MOVED FROM UPPER TO LOWER CORE
C
                     (JL.LE.KP)
                                                                              POMP
                                                                                     13
C
                    COUNT OF AVAILABLE PARCEL STORAGE LUCATIONS PAGSED POMP
      JP
                                                                                     14
C
                    IN THE PARCEL CORE STORAGE BLCCK SORT
                                                                              POMP
                                                                                     15
                     (JP.LE.NE.AND.JP.LE.KP)
C
                                                                              POMP
                                                                                     16
C
                                FARCELS IN COKE THAT ARE TO BE DUMPED
                    NUMBER CF
                                                                              POMP
                                                                                     17
C
                    ONTO TAPE
                                                                              PDMP
                                                                                     18
C
                     (KP=NIJ-NE)
                                                                              POMP
                                                                                     19
C
                    COUNT OF AVAILABLE PARCEL STOKAGE LOCATIONS IN
                                                                              POMP
C
                    CORE.
                             THIS IS THE NUMBER OF PARCELS REJECTED
                                                                              POMP
C
                                                                              PAMP
                    IN PCHECK.
                                                                                     22
C
                    A BLOCK COUNT OF DATA STOKED ON TAFE AND/OR IN CORE
                                                                              POMP
                                                                                     23
      NIJ
C
                                                                              POMP
                                                                                     24
C
      ALSO SEE OPM1 GLOSSARY
                                                                              POMP
                                                                                     25
C
                                                                              POMP
                                                                                     26
C
                                                                              POMP
                                                                                     27
C
                                                                              POMP
                                                                                     28
                                                     . IPNCH
                                                                  , IPOUT
                                                                              , POMP
                                          .IHOB
      COMMON /CONTAT/
                              IC (21)
                                          ,KPOUT
                                                                              , POMP
                              JPOUT
                                                      , KT AFE
     LISIN
                 , ISOUT
                                                                  .L TAPE
     ZHARRAY
                 3 TAPE
                             , MXREQ
                                         .50
                                                      , IN FAM
                                                                              POMP
                                                                                     31
                                                                              , POMP
      COMMON /PARDAT/
                                                      , COSA
                                                                                     32
                              ASC
                                          ,BSQ
                              ,PMAS(130) ,PSIZ(100) ,PO(100)
                                                                 ,SIGXO(108), POMP
     1 GAMA
                 .KTR (106)
                                                                                     33
                              TPAR(100) ,XPAR(130) ,YPAR(100) ,YPRML
                                                                              , POMP
     25IGYO(173),SINA
                                                                                     34
     3 YPR MU
                 .ZPAR(1CE)
                                                                              POMP
                                                                                     35
                                                      ,FSUM
      COMMON /RUNDAT/
                             С
                                          ·CF6
                                                                  ,ICTR
                                                                              , POMP
                                                                                     36
     1 MAPRUN
                              .NIJ
                                          . NURD
                                                      , NR EC
                                                                  ,NTASK
                                                                              , POMP
                                                                                     37
                 , NE
                                                                              POMP
     IT. (SI)CIPPOS
                                          .AFMAS (200)
                                                                                     38
                              • T2
      DATA PROGRHIGHPDMP
                                                                               POMP
C
                                                                               POMP
      KP=NIJ-NE
                                                                               POMP
       IF(NE.EQ.0) GO TO 1500
                                                                               POMP
                                                                                     42
       JP=1
                                                                               POMP
                                                                                     43
       M=NIJ+1
                                                                               POMP
```

SORT THROUGH THE STOPED PARTICLE DATA BLOCK AND MOVE ALL

J=1

45

46 47

48

POMP

PERE

```
POMP
      PARTICLE DATA TO BE SUMPED INTO LOWER CORE SC THAT IT IS
C
                                                                                      49
C
      CONTAINED IN A SOLIC DATA BLOCK (I.E. A CATA BLOCK WITH NO
                                                                               POMP
                                                                                      50
C
      REJECTED PARTICLES IN IT)
                                                                               POMP
                                                                                      51
C
                                                                               POMP
                                                                                      52
      00 3J8 I=1.KP
                                                                               POMP
                                                                                      53
                                                                               POMP
                                                                                      54
      IF (KTR(I).EQ.0) GO TO 300
                                                                               PUMP
                                                                                      55
      JP=JP+1
                                                                               FOHP
                                                                                      56
      00 200 K=J.NE
      1=4-K
                                                                               POMP
                                                                                      57
                                                                               POMP
                                                                                      58
      IF (KTR(L).EQ.1)GO TC 100
                                                                               POMP
                                                                                      59
      JL=JL+1
                                                                               POMP
      KK=K
                                                                                      60
                                                                               POMP
C
                                                                                      Si
      MOVE PARCEL DATA TO AVAILABLE STORAGE IN LOWER CORE
C
                                                                               POMP
                                                                                      62
¢
                                                                               POMP
                                                                                      63
      XPAR(I) = XPAR(L)
                                                                               POMP
                                                                                      64
      YPAR(I) = YPAR(L)
                                                                               POHP
                                                                                      65
                                                                               POMP
      ZPAR(I)=ZPAR(L)
                                                                                      66
                                                                               POMP
      TPAR(I) = TPAR(L)
                                                                                      67
                                                                               POMP
      SIGXO(I)=SIGXO(L)
                                                                                      68
      SIGYO(I)=SIGYO(L)
                                                                               POMP
                                                                                      69
      RO(I)=RO(L)
                                                                               POMP
                                                                                      70
      PSIZ(I) = PSIZ(L)
                                                                               POMP
                                                                                      71
                                                                               POMP
      PMAS(I) =PMAS(L)
                                                                                      72
                                                                               POMP
                                                                                      73
      GO TO 260
                                                                               POMP
  100 JP=JP+1
                                                                                      75
  200 CONTINUE
                                                                               POMP
  250 IRROR=- 250
                                                                               POMP
                                                                                      76
                                                                               POMP
                                                                                      77
       GO TO 2010
                                                                               PDMP
                                                                                      78
  26 ( J=KK+1
  300 CONTINUE
                                                                               POMP
                                                                                      79
       IF (JP.LE.NE) GO TO 500
                                                                               POMP
                                                                                      6 D
                                                                               POMP
                                                                                      81
  310 IRROR=-310
                                                                               POMP
                                                                                      82
      G0 TO 2000
                                                                               POMP
  506 IF(JL.LE.KP)GD TO 1000
                                                                                      83
                                                                               POMP
                                                                                      04
  510 IRROR=-510
                                                                                      85
 2000 CALL ERROR (PROGRM, IRROR, ISOUT)
                                                                               PDMP
                                                                               PUMP
                                                                                      86
 1000 WRITE (LTAPE)KP
       WRITE(LTAPE)(XPAR(I), YPAR(I), ZPAR(I), TFAR(I), SIGXO(I), SIGYO(I),
                                                                               POMP
                                                                                      67
      1 RO(I), PSIZ(I), PMAS(I), I=1, KP)
                                                                               POMP
                                                                                      88
                                                                               POMP
       RETURN
                                                                                      89
                                                                               POMP
                                                                                      90
       END
```

```
SRTCN
*DECK . SRTCNT
                                                                      SRTCN
     SUBROUTINE SRICHTE X, Y, CHT, K, CRDLBL)
                                                                      SRTCN
     H. G. NORMENT, ATMOSPHERIC SCIENCE ASSOCIATES - MARCH 1979
                                                                      SRTCH
                                                                      SRTCN
 GIVEN AN UNORDERED SET OF CONTOUR POINTS, THE POINTS ARE
     SEQUENCED SUCH THAT EACH SUCCESSOR POINT IS THE CLOSEST POINT TO SRTCN
     ITS PREDECESSOR. EACH CLOSED CONTOUR IS SEGREGATED.
                                                                      SRTCN 10
                                                                      SRTCN 11
SRTCN 13
                                                                      SRTCN 14
                  POINT CCURDINATES
                                                                      SRTCN 15
                  CONTOUR VALUE
        CNT -
                  NUMBER OF POINTS
                                                                      SRTCN 16
                  FIRST PCINT ON A CONTOUR
                                                                      SRTUN 17
        XX.YY-
                  MOST RECENTLY FOUND POINT ON A CONTCUR
                                                                      SRTON 18
                                                                      SRTCN 19
                                                     ******************** SRTCN 20
C
                                                                      SRTCN 21
                                               , IP NCH
                                                          ,IPOUT
                                                                     SRTCN 22
                           IC(5))
                                     ,1HOB
     COMMON /CONDAT/
                                                                     ,SRTCN 23
                                     ,KPUUT
                                               , KT AFE
                                                          .LTAPE
               .ISOUT
                          .JPOUT
     1ISIN
               . MBTAPE
                          .MXREQ
                                     ,50
                                               . IN FAM
                                                                      SRTCN 24
     2 MARRAY
     DIMENSION X(300), Y(300)
                                                                      SRTCN 25
     DATA CLR. PROGRM/ 1.E3G. 6HSRTCNT/
                                                                      SRTCN 26
                                                                      SRTCN 27
     CATA CODE/ 6HDELFIC/
      VEC(A+B+C+D) = (A-C)^{++}2 + (B-D)^{++}2
                                                                      SRTCN 28
                                                                      SRTCN 29
      ILOOP=0
                                                                      SRTCN 30
   49 IF( K .GT. 3) GO TO 55
                                                                      SRTCN 31
      WRITE(ISOUT, 3000)
                                                                      SRTCN 32
      00 50 I=1.K
                                                                      SRTCN 33
      WRITE ( ISOUT, 1000) CNT, X(I), Y(I)
                                                                      SRTCN 34
   50 IF(IPNCH . GT. )) WRITE(IFNCH, 2000) CNT, X(I), Y(I), CRULBL, CODE
                                                                      SRTCN 35
      IF(IPNCH .GT. 3) WRITE(IPNCH, 2300) CNT, X(1), Y(1), CRDLBL, CODE
      WRITE(ISOUT, 1000) CNT, X(1); Y(1)
                                                                      SRTCN 36
                                                                      SRTCN 37
      RETURN
                                                                      SRTCN 38
CHECK POINTS AND REARRANGE IF NEUESSARY TO AVOID A THO-POINT CLOSUKE
                                                                      SRTCN 39
   55 ILJOP=ILOOP+1
                                                                      SRTCN 40
      IF(ILOOF .GT. K) GO TO 10G
                                                                      SRTCN 41
      VEM=VEC (X(1),Y(1),X(2),Y(2))
                                                                      SRTCN 42
      H=2
                                                                      SRTCN 43
      70 6' I=3.K
                                                                      SRTCN 44
      IF(VEC(X(1),V(1),X(1),V(1)) .GT. VEH) GO TO 60
                                                                      SRTCN 45
                                                                      SRTCN 46
      V=4=VE3(X(1),Y(1),X(I),Y(I))
                                                                      SRTCN 47
   63 CONTINUE
                                                                      SRTCN 48
      DO 65 1=2.K
      IF(I .EQ. M) GO TO 65
                                                                      SRTCN 49
                                                                      SRTON 50
      IF (VEC(x(H),V(H),X(1),Y(I)) .LE. VEH) GO TO 10)
                                                                      SRTCN 51
   65 CONTINUE
                                                                      SRTCN 52
      YP=X(1)
                                                                      SRTCN 53
      YP=Y(1)
                                                                      SRTON 54
      00 7. I=2.K
                                                                      SRICN 55
      X ( I - 7 9 = X ( I )
                                                                      SRTCN 56
   73 Y(I-1)=Y(I)
                                                                      SRTCN 57
      ¥(K)=XP
                                                                      SRTON 58
      Y(K)=YP
                                                                      SRTCN 59
      50 TO 55
                                                                      SRTCH 50
COMMENCE CALCULATION OF A CONTOUR CLUSURE
```

```
100 \text{ XP} = X(1)
                                                                            SRTON 61
      YP = Y(1)
                                                                            SRICH 62
      XX = X(1)
                                                                            SRICN 63
      YY = Y(1)
                                                                            SRTCN 64
      KK = 1
                                                                            SRTCN 65
      VEH = VEC(XP, YP, X(2), Y(2))
                                                                            SRTCN 66
                                                                            SRTCN 67
      M = 2
      WRITE(ISOUT, 3000)
                                                                            SRTCN 68
      WRITE( ISOUT, 1000) CNT, XP, YP
                                                                            SRTCN 69
      IF(IPNCH .GT. 0) WRITE(IFNCH, 2000) CNT, XP, YP, CROLBL, CODE
                                                                            SRTCN 70
      L = 3
                                                                            SRTCN 71
 600 DO 700 I=L , K
                                                                            SRTCN 72
      IF(X(I) .EQ. CLR) GO TO 700
                                                                            SRTCN 73
      IF( VEC( XP, YP, X(I), Y(I)) .GT. VEM) GO TO 785
                                                                            SRTON 74
                                                                            SRTCN 75
      VEM = VEC(XP, YP, X(I), Y(I))
                                                                            SRTCN 76
                                                                            SRTCH 77
 700 CONTINUE
 701 \text{ XP} = X(M)
                                                                            SRTCN 78
      YP = Y(M)
                                                                            SRTCN 79
      X(M) = CLR
                                                                            SRTCH 50
      WRITE( ISOUT, 1000) CNT, XP, YP
                                                                            SRTON 31
      IF(IPNCH . GT. 0) HRITE(IPNCH, 20JU) CNT, XP, YP, CROLBL, COUE
                                                                            SRTCH 22
  702 IF( VEC( XP, YP, XX, YY ) .EQ. 3.0) GO TC 756
                                                                            SRTCN 83
      L= 1
                                                                            SRTCN 84
      KK = KK + 1
                                                                            SRTCN 35
  765 00 710 I=1.K
                                                                            SRTON 36
      IF( X(I) .EQ. CLR) GC TO 710
                                                                            SRTCN 87
      VEM= VEC( XP, YP, X(I), Y(I))
                                                                            SRTCN 88
      M = I
                                                                            SATUN 69
      GO TO 600
                                                                            SRTCN 91
  710 CONTINUE
                                                                            SRTCN 91
      CALL ERROR( PROGRM, -710, ISOUT)
                                                                            SRICN 92
  750 IF( KK .EQ. K) RETURN
                                                                            SRTON 43
COMMENCE INITIALIZATION FOR ANOTHER CLOSURE.
                                                                            SRICH 94
CONDENSE REMAINING POINTS INTO LOWER CORE.
                                                                            SRTCN 95
      KP=K-KK
                                                                            SRICH 96
      KKP=KP+1
                                                                            SRTON 37
      DO 778 I=1,KP
                                                                            SRTON 38
      IF(X(I) .NE. CLR) GC TO 770
                                                                            SRTCN 99
      DO 760 J=KKP.K
                                                                            SRICNITE
      IF(X(J) .EQ. CLR) GC TO 76.
                                                                            SRTCN111
      X(I)=X(J)
                                                                            SRTCN1.2
      (L)Y=(I)Y
                                                                            SRICN1.3
      X(J) = CLR
                                                                            SRTCN1.4
      GO TO 758
                                                                            SRTCN115
                                                                            SKTCH116
  760 CONTINUE
  765 CALL ERROR (PROGRM, -755, ISOUT)
                                                                            SRTON137
  768 KKP=J+1
                                                                            SRTCN1_8
  770 CONTINUE
                                                                            SRTCN139
      ILOOP=3
                                                                            SRTCN1: G
      K=KP
                                                                            SRTCN111
      GO TO 40
                                                                            SRTONILZ
 1000 FORMAT( 5X, 3F10.0)
                                                                            SRICH113
 2000 FORMAT( 3F10.0, 10X, A1G, 10X, A6)
                                                                            SRTC N114
 3000 FORMAT(1HO)
                                                                            SRTUN115
                                                                            SRICN116
      ENG
```

```
*DECK, PAN1
                                                                           PAH1
      SUBROUTINE PAN1
                                                                           PAH1
                  .SLOTHP .THSO
                                                                           PAM1
          CHOB
                                  TH LEMITH, FISSID )
                                                                           PAM1
      R C TOMPKINS -- US ARMY NUCLEAR CEFENSE LABS
                                                                           PAM1
      TAPELESS VERSION FEBRUARY 1971
                                                                           PAM1
      OCTOBER 1966
                                                                           PAM1
                                                                           PAM1
    EXECUTIVE PROGRAM FOR TIME-INDEPENDENT PART OF PARTICLE-ACTIVITY
                                                                                  9
                                                                           PAM1
    HODULE
                                                                           PAM1
                                                                                  10
                                                                           FAM1
                                                                                  :1
CALLED BY OPH1.....
                                                                           PAM1
                                                                                  12
                                                                           PA M1
                                                                                  13
         * * * * * * * * * * * GLOSSARY * * * * * * *
                                                                           PAM1
                                                                                  1 4
                                                                           PAM1
                                                                                  15
                                                                           PAM1
    CAPFIS
                  CAPTURE-TO-FISSION RATIO
                                                                                  16
                   NUMBER OF NEUTRONS EMITTED PER FISSION
                                                                           PAM1
                                                                                  17
    EHITN
    FISSID
                   SIX CHARACTER IDENTIFIER OF FISSION TYPE
                                                                           PAM1
                                                                                  10
                                                                                  19
                   LOGICAL ARRAY TO CONTROL FILE MANUFULATION
                                                                           PAM1
    IFTAPE(10)
                                                                           PAM1
                   (1) TRUE - SET INTP NOT EQUAL TO ISIN
                                                                                  2 11
                       FALSE - SET INTP = ISIN
                                                                           PAH1
C
                                                                                  21
C
                   (2) TRUE - SET KRO = INTP
                                                                           PAM1
                                                                                  2ء
                       FALSE - SET KRO = ISIN
                                                                           FAM1
                                                                                  23
C
                   (3) TRUE - WRITE FILE IPAN
                                                                           PAM1
                                                                                  24
                                                                           PAM1
                                                                                  25
                   (4) TRUE - READ FILE IPAM INTO MEMORY AND RETURN
                                                                           FAM1
                                                                                  46
                   (5-10) SFARES
                   BINARY FILE OF PAM1 OUTPUT FCK RESTARTS
C
    IPAH
                                                                           PAH1
                                                                                  ٤7
                   INPUT FILE (BCD) USED BY OTHER DELFIC MODULES
                                                                           PAM1
                                                                                  28
C
    ISIN
                   BCD FILE OF FAM OUTPUT FOR PERIPHERAL PRINTING
C
    KOUT
                                                                           PAM1
                   INPUT FILE (BCD) CONTAINING SOIL PARAMETERS
                                                                           PAM1
C
    KRD
                   LOGICAL ARRAY TO CONTROL WHITING OF KOUT, TRUE = WRITEPAM1
    NPRNT (20)
                                                                                  31
                        SETUP - TRANSITION CAFOS (MAKNING - PRODUCES SOMEFAM1
                                                                                  32
                            7JO PAGES)
                                                                           PAMI
                                                                                  33
C
C
                   (2)
                        SETUP - INTERMEDIATE FORM OF NUCLIDE TABLE COCTALPAM1
                                                                                  34
                        SETUP - FINAL FORM OF NUCLILE TABLE (OCTAL)
                                                                                  35
C
                   (3)
                                                                           PAN1
                        YIELD - FISSION YIELD TABLE
                                                                           PAM1
                                                                                  36
                   (4)
                        XPRP - EXPOSURE RATE MULTIPLIERS
                                                                           PAM1
                                                                                  37
C
                   (5)
                        FRATIO - REFRACTURY FRACTIONS (FR)
                                                                            PAM1
                                                                                  38
¢
                   (6)
C
                        FRATIO - SQUALE RUOT OF FR (BSUBK)
                                                                           PAM1
                                                                                  39
                   171
C
                        INDCO1 - INFORMATION STORED FOR USE BY INDCOZ
                                                                           PAM1
                                                                                  43
                   (6)
                        BATMAN - MUCLIDE ABUNCANCES (MARNING - THIS
                                                                            PAM1
C
                                                                                  41
                   (4)
                        OFTION COMBINED WITH JO = FALSE WILL BURY YOU
                                                                            PAM1
                                                                                  42
C
                                                                            PAM1
                                                                                  43
                        IN PAPER)
                   (16) GXPSR - FISSION PRODUCT ACTAVITY VS PART SIZE
                                                                            PAM1
                                                                                  44
C
                        (WARNING - SEE (31)
                                                                            PA 41
                                                                                  45
C
C
                   (11) INCCOR - INDUCED ACTIVITY (SOIL) VS PART SIZE
                                                                            PAM1
                                                                                  46
                                                                            PAM1
                                                                                  47
С
                        (WARNING - SEE (9))
                   (12) URAN - INJUCED ACTIVITY (MASS 239) VS PART SIZE
                                                                            PAH1
C
                                                                                  40
                        (WARNING - SEE (9))
                                                                            PAM1
                                                                                  49
C
                   (13) MCHCEP - SELECTED HASS CHAIN ACTIVITY VS PART SIZEPAM1
                                                                                  50
С
                   (14) SPARE
C
                                                                            PAM1
                                                                                  51
                   (15) PAM2 - DO NOT HRITE TUTAL ALTIVITY VS PARTICLÉ
                                                                            PANI
С
                                                                                  53
                        SIZE (MARNING-SEE (9))
                                                                            PAM1
С
                   (16-20) SPARES
                                                                            PAM1
                                                                                  54
                                                                            PAM1
                                                                                  55
                   RUN IDENTIFICATION FOR FARTICLE-ACTIVITY MODULE
C
    PAHID(12)
                                                                            PAN1
                                                                                  56
C
                                                                            PAH1
                                                                                  57
                                                               .IPAH
      COMMON /CONDAT/
                             10(57)
                                                   . IPNCH
                                                                           . PAH1
                                                                                  56
                                        FOHI.
                             ,JPOUT
                                                    .KT AFE
                 . ISOUT
                                        .KPGUT
                                                                           .PAM1
                                                               .LTAPE
                                                                                  59
     1 KRD
                 . HBT APE
                                                                            PAMI
     2MARRAY
                             .MXKEQ
                                        .SIGMA
                                                    .INTF
```

```
COMMON /OECAY/ IGO, JC, KDOS, TENTER, TEXIT, TIME
                                                                     PAK1
                                                                           61
COMMON /FISHIN/ ABEGN(700), ABUNDC(700), BRANCH(130), CAPFIS,
                                                                     PAM1
                                                                           62
  DCON(730) JIBRA. INUC, MAXNUC, MULT(11), NUCLID (700)
                                                                     PAM1
                                                                           63
 COMMON /FRYLNG/ BSUEK(90),ERM(185),JRM(185),KRM,ECF(90)
                                                                     PAM1
                                                                           64
 COMMON/INDUS/ALBFOM, FAC (7,18), FOGRNY (7,18), ISC (18), LM X, XLAM (7,18) PAM1
                                                                           65
COMMON /OUTPUT/ FISHLM, FF(200), FM, ITAB, JGO, MASCHN, PSIZE(200),
                                                                     PAM1
                                                                           66
1 FMASS(200) .PACT(200)
                                                                     PAM1
                                                                           67
 COMMON /UTILITY/ KCUT, NPRNT (15)
                                                                     PAH1
                                                                           68
 LOGICAL IGO.JD.KDOS.NPRNT
                                                                     PAM1
                                                                           69
 INTEGER TYPE(12) , FISSID
                                                                     PAH1
                                                                           70
 DATA TYPE/6HP239FI,6HP239HE,6HP239TH,6HU233FI,6HU233HE,6HU233TH,
                                                                     PAM1
                                                                           71
           6HU235FI, 6HU235HE, 6HU235TH, 6HU238FI, 6HU238HE, 6HU238TN/
                                                                     PAM1
                                                                           72
                                                                     PAM1
                                                                           73
DATA (BRANCH(I), I=1,95
                                                                     PAM1
                          )/
                                                                           74
$ 6.0000C0E-1, 4.0000C0E-1, 3.600C00E-1, 6.40G0UJE-1, 5.0UJ0J0E-1, PAM1
                                                                           75
 5.000030E-1, 6.000000E-2, 9.400000E-1, 4.400000E-1, 5.600000E-1, PAM1
                                                                           76
  1. 0000JJE-1, 9.000000E-1, 1.900000E-1, 8.10000E-1, 3.0000J0E-2, PAM1
                                                                           77
$ 9.730333E-1, 7.600600E-2, 9.300U00E-1, 1.186030E-1, 8.820000E-1, PAM1
                                                                           78
$ 1.500000E-1, 8.5000COE-1, 6.30000JE-1, 4.000000E-1, 2.500000E-1, PAM1
                                                                           79
$ 7.530980E-1, 2.0000C9E-2, 9.80000BE-1, 9.60000E-1, 4.038300E-2, PAM1
                                                                           80
$ 8.700030E-1, 1.3000CUE-1, 5.900GJJE-1, 5.00GG9GE-1, 9.950JJ0E-1, PAM1
                                                                           81
$ 5.00000E-3, 2.060000E-1, 7.94000JE-1, 5.0000JE-1, 5.000JUE-1, PAM1
                                                                           82
$ 5.000009E-1, 5.000000E-1, 5.000000E-1, 5.000000E-1, 1.0000000E-2, PAM1
                                                                           83
$ 9.970000E-1, 6.8000(0E-1, 3.200000E-1, 5.000000E-1, 5.000000E-1, PAM1
                                                                           84
$ 9.000033E-1, 1.0000C0E-1, 5.300C00E-1, 5.00Cu30E-1, 7.20000E-1, PAM1
                                                                           85
 1.4'3'. 'E-1, 1.4000JE-1, 9.3"700JE-2, 9.1000005-1, 9.500J00E-1, PAM1
                                                                           د 6
  5.010000E-2, 5.000000E-1, 5.00100JE-1, 6.000000E-1, 1.000J30E-1, PAM1
                                                                           87
 3.0700033E-1, 2.190000E-1, 7.80000UE-1, 1.00000CE-3, 5.00000GE-1, PAM1
                                                                           88
 5.000000E-1, 5.0000COE-2, 5.00000JE-1, 4.500000E-1, 5.000000E-1, PAM1
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$ 6.931470E-1, 1.350223E-2, 5.354871E-4, E.41602EE-6, 4.813521E-4/ PAM1 2:1
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$ 9.955882E-7, 6.685446E-7, 0.000000
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3 1.93]42JE-1, 2.31]459E-2, 9.6∠7.42E-5, 3.62E6J4E-6, 9.0]JuljC
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$ 6.931470E+1, 4.62098BE-1, 2.7725odE-1, 4.62.98UE-2, U.033730U
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$ 0.399943
              ..000000
                          . 0.000000
                                                                    PAM1 250
             (I), I=1,95
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$-8.400000E-7, 1.170000E-5,-1.8900J0E-6, 7.79000LE-8,-3.6500C0E-6, PAM1 251
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$ 2.77000JE-7, 2.320CCGE-7,-9.173JJGE-6,-9.09U0JGE-7, 2.77JJGGE-8, PAM1 255
$-2.993J70E-6, 4.750100E-7,-4.103000E-6,-7.68.630E-6, 3.12J040E-6, PAM1 256
$-1.690003E-5, 1.1000CDE-5,-8.990GJJE-6,-4.18UUOCE-6, 2.82UGUJE-6, PAM1 257
$ 1.730990E-8.-5.880000E-6. 1.2209J0E-6.-1.14009DE-6. 4.880000E-7. PAM1 258
$ 1.660000E-7,-3.480000E-6,-3.78000E-6, 1.33003E-6, 3.91030E-6, PAM1 259
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$ 7.4503CJE-7,-6.37C000E-6,-7.9201JGE-6, 1.9300CLE-6,-5.35JUJUE-6, PAM1 261
$-2.61Jn07E-6, 1.223J00E-7,-2.15J03UE-7, 3.00L000E-6,-3.88U00UE-6, PAM1 262
$ 4.17.33.E-7, 1.750330E-7,-0.663333E-6, 1.48060CE-6,-1.223C0DE-6, PAM1 263
 1.7401CGE-6,-2.650CCGE-7, 2.36000UE-6,-6.37UG 30E-7, 6.91J0UGE-7, PAM1 264
$ 1.690]]]E-7, 8.05CCC0E-8,-3.4uJ0J0E-7, 8.90LUJ0E-7, 3.77UUQ0E-7, PAN1 265
$ 1.310333E-7,-1.250CCOE-7, 3.240000E-6,-1.770000E-7, 1.0400JCE-6, PAM1 266
$ 1.0200 JJE-6,-6.430 000E-6,-7.080 UJUE-6, 5.2500 9CE-7, 3.850 JUDE-6, PAM1 267
$ 1.220000E-6,-1.160000E-6,-2.690000E-7, 4.070000E-6, 1.470000E-7, FAM1 268
$-2.710000E-6.-4.690000E-6.-4.8400J0E-7, 2.02000E-6.-5.350J00E-6/ PAM1 269
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$ 2.5407QUE-6, 3.2700CDE-7,-9.39U0JUE-6,-2.71J00DE-6, 2.63J0JDE-6, PAM1 272
$ 5.142003E-7. 2.340000E-8.-2.390000E-6, 9.280070E-6, 4.900030E-7, PAM1 273
$-5.400000E-6, 1.830000E-7, 1.25000DE-6, 4.300000E-7,-7.840000E-6, PAM1 274
$-3.180000E-6, 9.30000E-6, 2.130000E-6, 2.210000E-6, 1.98000E-7, PAM1 275
$-1.440]0CE-6, 1.120]COE-5,-1.120COOE-5, 7.84COOCE-6, 3.1400]CE-6, PAM1 276
$ 3.840000E-7, 3.0600COE-7,-6.8430JUE-6, 1.22.0 10E-5, 7.540000E-7, PAMI 277
8 8.130703E-6.-1.5650 (9E-5. 2.390000E-6. 1.490000E-6.-1.210 R. CE-5. PAM1 278
$ 1.170000E-5.-3.180000E-6,-4.410000E-6, 9.790000E-6.-1.4600300E-6, PAMI 279
$ 1.10000JE-6. 2.55030BE-7.-3.230300E-6. 1.160030E-6. 1.140000E-5. PAMI 200
$-3.650J0JE-6, 1.27J0CCE+7, 4.670J0QE-7,-4.95.0JCE-6, 6.J10J0UE-6, PAM1 281
$-5.74000JE-6, 3.500J(JE-6,-1.230JGGE-7, 1.40JGGGE-7,-3.65JJGGE-6, FAM1 282
$ 4.390303E-6.-1.900800E-6, 6.53908DE-6,-9.60tu 16E-7,-5.2830uDE-6, PAMI 233
$-1.229JJJE-6. 2.80JCGGE-8,-8.460JJGE-6,-5.6QCGJUE-6, 1.29JCQGE-6, PAM1 254
$-3.430303E-6. 1.920000E-6, 5.86303JE-6,-8.04683CE-7, 1.85433E-7, PAM1 285
$-6.010100E-6.-7.2600QUE-7, 2.090030E-7,-3.02000E-6.-3.38000DE-6. PAM1 286
$-2.710000E-6, 6.300000E-6, -3.950030E-7, -2.020000E-6, -2.03000E-6, PAMA 287
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                         . 0.30000
$ 2.430999E-7, 6.300000
              (i.J), I=1,7),J= 1,13)/
                                                                    PAM1 289
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                                                                  , PAH1 290
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                                        . 0.000000
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                                                                  , FAM1 291
$ 0.070007
                                                     , 4.828905E-2, PAMI 292
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                                        , i.Qio;00
$ 0.000003
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                                                     . 0.0000000
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                                                                  , PAM1 294
             , 8.997160E-2, 6.149832E-4, 3.324437E-3, 0.000000
  0.000000
                                       . 2.7141576-3: J. U.J. 0.J.
                                                                  , FAM1 295
                           • 0.100010
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  0.010300
                                                    , 3.46.000
                                                                  , PAM1 296
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  1.330000
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                           ,
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                                                                  , PAM1 297
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$ 0.000051
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$ 6.379338E-4, 4.555539E-5, 0.000000
                                        . 0.00.000
                                                     . 0.003300
$ 1.497511E-7. 0.000000
                           . 0.1.0010
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$ 0.000300
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                                         , 1.969533E-2, 8.119759E-5, PAM1 332
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                                                                    , PAM1 303
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                                                                    , PAM1 304
 0.030100
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                                                                    , PAM1 305
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                                                                      PAM1 309
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                                                                     , PAM1 313
 1.738866E~4,
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                                                                    . PAM1 314
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                4.80 J69UE-4. U.389 J00
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                                                         0.000000
                                          4.538654E-4. 0.0000C0
                                                                      PAM1 315
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$ 0.000000
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               0.0000000
                           . 6.000000
                                         . 0.000000
                                                       . 0.030000
                                                                    / PAM1 316
$ 0_0000330
 DATA ((FOGRNY(I.J), I=1,7), J=1,13 )/
                                                                      PAM1 317
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                           . 0.001000
                                         . 5.862730E-6. 0.000030
                                                                      PAM1 318
$ 0.000000
                                                       . 0.000000
                                                                    , FAM1 319
                                         . 0.080808
$ 6.000000
               0.000000
                           . 0.000000
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             . 0.000130
                           . 0.000000
                                         . 7.000.00
                                                       . 0.003040
                                                                    , PAM1 320
                                                       . 0.000000
                                                                      PAM1 321
$ 0.000000
               4.228 COGE-8, 0.300000
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$ 0.000000
                                                                      PAH1 322
               7.370C00E-7. 0.000000
                                          1.2510U0E-6, 0.0JU0J0
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                                                                     , PAM1 323
                                         . 7.75 LD CGE-6, 0.000000
               0.300000
 0.000000
                G- 400 C00
                           . 0.900000
                                         , J.0000000
                                                        0.000010
                                                                     , PAM1 324
                                                       .
                                                                     , PAM1 325
  1.710100E-5,
                0.000110
                           . 3.300000
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                                                                      PAM1 326
  0.000053
                0.000000
                           . 0.700330
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                                                                      PAM1 327
  7.0003.0
                1.892300E-6. 0.J00000
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                                                                     , PAM1 328
$ 0.000000
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                                         . 0.000000
                                                         0.000300
                                                         1.063076E-5, PAM1 329
$ 0.300000
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               0.700100
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                                                                    , PAM1 331
                           . 0.00000
                                           3.69.600
                                                         0.000000
 9.000700
                0.000000
                                                                     , PAM1 332
$ 0.00000
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                                                         0.00000
                                                                     , PAM1 333
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$ 0.100300
                                                        0.000000
                           , 8.62675JE-6, C.OULUJU
                                                                     , PAM1 334
                           . 0.000000
                                         , 4.0000000
$ 0.000000
               0 - 400 000
                                                        0 - 0 ( 0 0 0 0 0
                                                                     . PAM1 335
$ 8.000000
                4.546CGJE-6. 0.000000
                                         . 0.000000
                                                        0.000000
$ 0.090909
                                                                      PAM1
                                                                            336
 DATA ((FOGRNY(I, J), I=1,7), J=14,18)/
                                                                      PAM1 337
                                                                     , PAM1 338
$ 0.000000
                5.4938(0E-7, 0.000000
                                         . J. E O L G 7 C
                                                        0.0.0000
                                                                      PAM1 339
                                                        0.000000
  0.010000
                0.000000
                           , 0.303333
                                          6.62LUJQE-6,
                             0.00000
                                           0.000000
                                                        1.575) JCE-7, PAM1 340
$ 1.000000
               0.000000
                                                                     , PAM1 341
$ 0.000000
                9.000000
                             0.000000
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                                                         0.044440
                                                         0.000000
                                                                     , PAM1 342
                           , 0.333000
                                         , 0.000000
$ 0.170000
                0.000000
                                                       ,
                           . 0.000000
                                                       . 9.060000
                                                                     , PAM1 343
                0.000000
                                         . 3.000030
3 0.000000
                           . 0.00000
                                                                     / PAM1 344
$ 0.000000
                0.00000
                                         0.000000
                                                                      PAM1 345
 DATA ((XLAM
               (I_yJ), I=1,7), J=1,13
$ 7.418866E-9, 7.46124E-35, 6.93001E-31, 1.743659E-7, 0.0000JD
                                                                     , PAM1 346
                           . 3.487319E-R, 6.93LODE-31, 6.93JODE-31, PAM1 347
$ 9.000000
                0.000000
$ 6.930]3E-31, 6.930[3E-31, 1.169444E-5, 3.20&333E-3, 6.93604E-31, PAM1 348
                                         . 0.000400
                                                       . 0.8.00000
  6.93077E-31, 7.347328E-5, 0.70000
                                                                     , PAM1 349
                                                                     ,PAM1 350
              , 1.669219E-17, 6.93JJJE-31, 1.552419E-5, J. U00JU0
  9. 300000
                                                                     . PAM1 351
                           . 0.3333303
                                         , 5.021739E-3, 0.0JJJJO
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                                                       . 0.0.0000
                           . 0.300303
                                                                     , PAM1 352
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  0.300000
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                           , 0.130003
                                                       . 0.000000
                                                                     . PAM1 353
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  1.283333E-5,
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                           , 6.33030E-31, 6.93000E-31, 6.93000E-31, PAM1 354
  0.000000
 6.930u0E-31, 1.991379E-3, 0.300CJ0
                                                       . 6.93JJBE-31. FAM1 355
                                         , J. 60[J]L
                                                                     , PAN1 356
                                                       . 0.000000
                           . 0.300000
                                         . 0.000000
 1.77J955E-9, 0.00000
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              . 0.000100
                           . 1.360000
                                         . 7.129820E-14, 3.083300E-4.PAM1 358
$ 0.000000
              , 0.330000
                           . 0.960930
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$ 0.010000
                                                     • 0•0*90*0
                                                                    , FAM1 359
$ 2.]05208E-8, 6.930LGE-31, 6.93JGUE-31, 6.93UUE-31, 6.93UUE-31, FAM1 360
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. PAH1 361
                                                        , 0.000000
$ 4.095745E-6, 4.812500E-4, 7.461240E-5, 0.00L090
                                                        , 1.28333E-34, PAH1 362
$ 0.300000 , 0.3000000 , 0.300000
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                                          . 0.000000
                                                        . 0.000000
                                                                       , PAM1 363
$ 6.93000E-31, 1.215789E-3, 0.300003
                                                                        PAH1 364
$ 0.000000
                                                                        PAM1 365
 DATA ((XLAM (I,J), I=1,7), J=14,18)/
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                                          , 0.00.800
                                                        , 0.233933
                                                                       . PAM1 366
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                                                                       , PAM1 367
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$ 0.000000
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                                         , 0.000000
                                                        , 2.885192E-7, PAM1 368
$ 0.070000
              . 0.000000
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                                                                      , PAM1 369
$ 6.93000E-31, 6.930(0E-31, 3.208333E-3, 0.00(000
                                                                      . PAH1 370
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 0.0000000
              , 5.608974E-7, 0.000000
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                                          , 6.93L00E-31, 0.000000
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                                                                      / PAH1 372
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$ 0.000007
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 DATA ALBFOM/ 1.699999E+3 /
                                                                        PAH1 374
 DATA (JRM
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                           5,
                                                                    17. PAN1 375
             4.
                                        11.
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            18,
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                                                                    39, PAM1 376
                          25,
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            40.
                          41.
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                                                      46,
                                                                    85, PAM1 378
                                       78,
            56,
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                                                      84,
                                                                   161, PAH1 379
                                                     100,
            86,
                         87.
                                       93,
                                                                   123, PAM1 380
                        109,
                                       115,
                                                     122,
           138,
                                                     145,
                                                                   146, PAM1 381
$
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                        129,
                                       136,
                                                                   161, PAM1 382
8
                        153,
                                       154,
                                                     160.
          147,
                                       176,
                                                                   178, PAM1 383
$
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                        169.
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                                                     194,
                                                                   209, PAM1. 384
3
          136.
                        192,
                                       193,
                                                                   232, PAM1 305
          210,
                         218,
                                       224,
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$
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                                       249,
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                                                    . 268,
                                                                   274, PAH1 387
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                                                                   293, PAM1 388
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                         283,
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           294,
                        295,
                                       308,
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                         317,
                                       318,
                                                     341,
           311.
           343,
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                                                     359,
                                                                   360, PAM1 391
                                                                   379, PAM1 392
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                                                                   408/ PAM1 393
                         392.
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                                                     402,
                                                                         PAM1 394
            •I),I=96,185 )/
 DATA (JRM
                                                                   425, PAH1 395
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                         427,
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           442.
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           456,
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                                                                   468. PAM1 398
                                                     460.
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                                                     476,
                                                                   477, PAM1 399
3
           473,
                         474.
                                       475,
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           483.
                         4817.
                                                                   501, PAM1 431
           497-
                         49 ,
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                                                                   51 , PAM1 432
                         507.
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                                                                   535, PAM1 4.3
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                         523,
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                                                                   544, PAM1 4:4
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           536,
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                         55J,
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                                                                   557, PAM1 435
                                       551,
           549.
                                       571,
                         564,
                                                     572,
                                                                   578. PAM1 406
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                         585.
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                                                      593,
                                                                   602, PAM1 407
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                                                                   622, PAM1 438
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                                                                   639, FAM1 639
                                                     678,
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                                                     659,
                                                                   565. PAME 410
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           646.
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                                       677,
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  474 (MUCE IC(I), 1= 1, 45
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                                                            3671616360 . PAM1 419
  - 3676753454. 9671626547.
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                                13.5639276.
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$ 11551903748, 11552161796,-11552460804, 115524 28336, 11552686084. PAM1 441
$-11605335044, 11685597188, 11685859332, 11606146594, 116 86383620, PAM1 442
$ 11686645764, 11686903{12,-11819552772, 11819814916, 1182D077J6D, PAM1 443
$ 11820360226, 11820601348, 11820863492, 11821121540,-11954032644, PAM1 444
$ 11954294788, 11954573858, 11954819076, 11955081220, 11955347460, PAM1 445
$-11955638276, 11955601412,-12J88253372, 12C88512516, 12088799778, PAM1 446
$ 12089736834, 12089298948, 12789561092, 12089823236, 12090J31204, PAM1 447
$-1222273D244, 12222992388, 12223254532, 12223518876, 12223779842, PAM1 448
$ 12224073732, 12224C40564, 12224299012,-12356947972, 12357210116, PAM1 449
$ 12357472260, 12357734404, 12357936548, 12358256692, 12358516740, PAM1 450
$-12491165700, 12491427844, 12491639988, 12491952132, 12492214276, FAM1 451
$ 12492476420, 12492739586, 12493033476, 12492936612,-12625645572, PAM1 452
$ 126259)7716, 12626169860, 126264320u4, 12626694148, 12526952196, PAM1 453
$-12759863300, 12760125444, 127€]387568, 12760649732, 1276ú911876, FAM1 454
$ 12761175042, 12761468932, 12761436164, 12761694212,-12894001028, PAM1 455
 12894343172, 12894605316, 12894867460, 12895129 £04, 1,895387652, PAM1 456
$-12895653892, 12895911940,-13728560900, 13028823044, 13029085188/ FAM1 457
 DATA (NUCLID(I), I=191,285)/
                                                                   PAM1 458
$ 1302^347332, 13029610498, 13023914388, 13029071620, 13030129668, PAM1 459
$-131627/8628, 1316304u772, 131633)2416, 13163565060, 13163831300, PAM1 460
$-13164126212, 13164189348, 13164347396,-13297256500, 13297526644, PAM1 461
  13297782788, 13298044932, 132983C7C76, 1329857C2A2, 13290064132, PAM1 462
$ 13298631364, 13299089412,-13431733372, 13432010516, 1343226266J, PAMI 463
$ 13432524894, 13432782852,-13433749092, 13433307140,-13565946100, PAM1 464
 13566218244, 13566480388, 13566742532, 13567004876, 13567268829, PAM1 465
 -13567524868,-1370J173828, 1370J435972, 1370U698116, 137UJ96D260, PAM1 466
  13701223426, 13701521412, 13701484548, 13701742536,-138346537u0, PAM1 467
3 13834915844, 13835177988, 13835443132, 13835782276, 13835365442, PAMI 468
$ 13836259332. 13836222468.-13308571426. 13969133572. 13969395716. PAMA 469
$ 13969657861, 1396592004, 13970178u52,-1397L477C66, 1397U444292, FAML %7C
3 13270702340,-14103089156, 141033513u0, 14103612444, 141J3876538, FAM1 4/1
3 1+1)4137732, 14104400898, 14104694788, 141046e2326, 14104926068, 24M1 4/2
3-14237376884. 14237569028. 14237631172. 1423e19331e. 14238356461. PAM1 473
3 1+238621779,-14238916612, 14233879748, 14239£3779t,-14371786756, PAM≥ 474
 14372343906. 14372311644. 14372573166. 14372836354. 14373136244. PAPL 475
 14373797676, 14373359620, 14373617656,-14586634444, 14546266626, 4441 476
$ 14576529772. 14566757916. 14357353300. 14507315204. 14507575252/ PAM1 4//
 NESS : ARSEL (IDGI) ATAC
                                                                   1441 475
$-1+0+1272212. 1414348435c. 1+0+37365.C. 14641838644. 14641271813. FAML 4/4
$ 1-6-156-7730. 14(41523564. 1-04142/044. 14641705176. .4641369408. +841 4-3
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$ 14642053124,-14774702084, 14774964228, 14775226372, 147754d8516, PAM1 4o1
 14775753665, 14776068708,-14908919812, 14909181956, 14939444100, PAM1 462
$ 14939736244, 14909969410, 14910264322, 14910231554, 14910525444, FAM1 463
$ 1/910492676, 14910750724,-15J43399664, 15u43661628, 15043923972, PAM1 484
$ 15044186116, 25044448260, 15044710404, 150449(8452,-15177617412, FAM1 405
$ 15177879556, 15178141700, 15178493844, 15178665388, 15178961922, PAM1 486
$ 15178928132, 15179186180,-15311835140, 15312097284, 15312359428, PAN1 467
$ 15312621572, 15312883716, 15313145860, 153134J39J8,-15446315012, PAM1 488
$ 15446577156. 15446839300. 15447102466, 15447397569, 15447364610. PAM1 459
$ 15447666692, 15447525732, 15447921666, 15447687676, 15446145924, PAN1 490
$-15580532740, 15580794884, 15581057028, 15581319172, 15581581316, PAM1 491
$ 15581839364,-15714750468, 15715012612, 15715274756, 15715536900, PAM1 492
$ 15715600066, 15716095169, 15716061188, 15716357761, 15716327428, FAM1 493
$ 15716618244, 15716581380,-1534923u340, 15849%92484, 15849754628, PAN1 494
$ 15850016772, 15850283012,-15850577924. 15850541060, 15850799108, PAM1 495
$-15983448068, 15983710212, 15983972356, 15984235522, 15984533508, PAM1 496
$ 15984496644, 15984752769, 15984758788, 15985053700, 15985016836/ PAM1 497
DATA (NUCLID(I), I=381-475)/
                                                                     PAM1 498
$-16117927940, 16118190084, 16118452228, 16118714372, 16118976516, PAM1 499
$ 16119234564,-16252145668, 16252407812, 16252669955, 16252933122, PAM1 500
$ 16253235204, 16253198340,-16253493252, 16253456388, 16253714436, PAM1 501
$-16386625540, 16386887684, 16387149828, 16387411972, 1638767CU20, PAM1 5J2
$-16387969028, 16387940698, 16388134308,-16520843268, 16521105412, PAM1 5J3
$ 16521368578, 16521670t60, 16521633756, -16521928708, 16521891844, PAM1 504
$ 16522149892;-16655060998, 16655323140, 16655585284, 16655847428, PAMA 5J5
$ 16656105476,-16656445444,-16656408580,-16656371716, 16656629764, PAM1 5u6
$-16789540868, 167894C3012, 1679JC66178, 1679J364164, 16790327300, PAM1 5U7
$ 16790590466, 16790884356, 16790847492,-16923758596, 16924028740, PAM1 508
$ 16924282884, 16924545028, 16924840962, 16924807172, 16925065220, PAM1 509
$-17357976324, 1705823846 £, 17058501634, 17058799620, 17156762736, FAM1 510
$ 17059025922, 17059320834, 17059287044, 17059545092,-17192456196, PAM1 511
£ 17192718340, 171929£1506, 17193279492, 17193242£2£, 171935ú0676, PAM1 512
$-17193767458, 17194324964,-17326673924; 17326936068, 17327198212, PAM1 513
$ 17327461378, 17327756290, 173277225u0, 17327988740,-17328279556, PAML 514
$ 17328242592,-17460491652, 17461153796, 17461416962, 17461714948, PAM1 515
$ 17461678084, 17461936132,-174622J2372, 17462460420,-175951J9360, PAM1 516
$ 17595371524, 17595633666, 17595896034, 17596191746, 17596157956/ PAM1 517
 DATA (NUCLIDII).I=476,570)/
                                                                     PAM1 518
$ 17596421122, 17596715012, 17596678148,-17729327108, 17729589252, PAM1 519
$ 17729851396, 17770113540, 17730379684, 17731637828, 17731895876, PAMI 520
$-17863876980, 17864469124, 17864332290, 17864627202, 17864593412, PAM1 521
$ 17864856578, 17865150468, 17865117700, 17965375748,-17998024708, PAM1 522
$ 17998286852, 17998548596, 17398811140, 17999073284, 17959331332, FAM1 523
$-17999630346, 17999597572, 17399855620,-18132534580, 18132766724, PAM1 524
3 18133028868, 18133292034, 18133589924, 18133553156, 18133315300, PAM1 525
$ 18134J73348,-18266984452, 10267246596, 1026759874L, 18267766788, PAMI 526
5-18268933328, 18268291075,-19481232180, 16401464324, 16401743394, FAML 527
$ 18431989612, 1840225177d, 16402545668, 10462538F34,-18535419968, PAM1 528
$ 18535682052, 18535965218, 18536296346, 18536468484, 15536726532, PAML 529
$-13536492772, 18537250820,-19669699780, 18676182946, 18675424J68, PAM1 530
$ 18679686212. 18678948356. 19071236434.-18804717508. 10834379652. HAHL 531
$ 13834641796, 13394323940, 10835166024, 162054262228, 13825686276, PAM1 532
3-15938597380, 18933859524, 18939121668, 18939383812, 169396+5956, FAMI 533
$ 1893993813C. 16940166148,-19372thblut. 19u73G79252. 19173G35396. PAMI 534
$ 19073631945. 19373863684. 19374121732,-1926733286. 19237294968. FAM1 535
5 19237557124, 19287819268, 1928autile, 1928t343555, 19238645788, PAMI 536
$ 19209863748.-193415127C8. 19341774852. 19342336996. 19342299144/ FAML 537
 PATA (MUCLIDET) . I = 571.6651/
                                                                     PAME 558
C 13342561294, 19342623426, 19343131476.-1447523C436. 13475432562 . PAMA 539
$ 11476254724, 19476516668, 19476779612, 154777,41156, 19477739864, 4441 548
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$-19609948164, 19610210308, 19610472452, 19610734596, 19610996740, PAM1 541
      19611258884, 19611516932,-19744428036, 19744690180, 19744952324, PAM1 542
    $ 19745214468, 19745476E12, 19745738756, 19746000900, 19746258948, PAM1 543
    $-19878645764, 19878987998, 19879173052, 19879432196, 19879694348, PAM1 544
      19879952388,-19880218628, 19380476676,-20013125636, 20013387780, PAM1 545
     $ 20113649924, 20013912068, 20114174212, 20014436356, 20014694404, PAM1 546
     $-20147343364, 20147605506, 20147867652, 20148129796, 20148387844, PAM1 547
     $-20148654084, 20148912132,-20281823236, 20282085380, 20282347524, FAM1 548
     $ 20282609668, 20282871 (12, 20283133956, 20283392(04,-20416J40964, PAM1 549
      204163J310 4, 20416565252, 2J416827396, 2J417089540, 2J417347588, PAM1 550
     $-20417647650,-20417618466, 20417871876,-20556258692, 20550520836, PAM1 551
     $ 20550782980, 20551045124, 20551307268, 20551569412, 20551827460, PAM1 552
     $-20684738564, 20685000708, 20685262852, 20685524996, 20685783044, PAM1 553
     $-20686049284, 20686307332,-20818956292, 20819218436, 2u819480580, PAM1 554
     $ 23819742724, 20820004868, 2082J267012, 20820525060,-20953436164, PAM1 555
     $ 20953698308, 20953960452, 20954222596, 20954484740, 20954742788, PAM1 556
     $-21087653892, 21687916036, 21088178180, 21088446324, 21086702468/ PAM1 557
     DATA (NUCLID(I), I=666, 700)/
                                                                               558
     $ 21088960516,-21221871620, 21222133764, 21222395908, 21222658052, PAM1 559
      21222920196, 21223178244,-21356351492, 21356613636, 21356875760, PAM1 560
      21357137924, 21357400068, 21357658116,-2149u569220, 2149J831364, PAM1 561
      21491093508, 21491355652, 21491613700,-21491879940, 21492137988, PAM1 562
     $-21624706948, 21625049092, 21625311236, 21625573380, 21625835524, PAM1 563
                                                                       0, PAM1 564
     $ 21626097668, 21626355716,
                                            0,
                                                         0,
                                            0,
                                                         Û,
                 0.
                                                                       0/ PAM1 565
                              ٥,
      DATA (MULT
                                                                          PAM1 566
                 (I), I=1,11
                               )/
     *
                 8,
                             64,
                                          512,
                                                      4096.
                                                                   32768. PAM1
                                                                               567
     *
            262144,
                        2097152,
                                     16777216,
                                                 134217728,
                                                             1073741824, PAM1 568
        8589934592/
                                                                          PAM1 569
     S
      DATA IBRA, INUC, KRM, LMAX, MAXNUC/
                                                                          PAM1 570
                                          181,
                                                                     700/ PAM1 571
                                                                    ******PAM1 572
                                                                          PAM1 573
   13 FORMAT(A6)
                                                                          PAM1 574
                                                                          PAM1 575
   14 FORMAT ((5E14.6))
                                                                          PAM1 576
C
                                                                          PAM1 577
C
      SEARCH FOR KIND OF FISSION TO USE
                                                                          PAM1 578
C
                                                                          PAM1 579
      DO 300 I=1,12
      IF (FISSID.EQ.TYPE(I)) GO TO 305
                                                                          PAM1 580
300
                                                                          PAM1 581
      CONTINUE
C
                                                                          PAM1 582
С
      FISSION TYPE REQUESTED IS NOT IN TABLE--FRINT EFROR
                                                                          PAM1. 583
                                                                          PAM1
      WRITE (KOUT,6COO) FISSID
                                                                          PAM1 585
 6CJO FORMAT(1H), 17HFISSICN DATA FOR A6, 30H TYPE FISSION IS NOT AVAILAPAM1 566
    18LE)
                                                                          PAM1 587
      CALL ERROR(6H PAP1 ,-6300, ISOUT)
                                                                          PAM1 588
                                                                          FAM1 589
                                                                          PAM1 590
      TYPE FISSION REQUESTED FOUND IN TABLES
C
                                                                          PAM1 591
C
С
      LOAD THIS DATA INTO ABEGN
                                                                          PAM1 592
                                                                          PAH1 593
C
                                                                          PAH1 594
 365
      CONTINUE
                                                                          PAH1 5.5
С
                                                                          PAN1 596
      LOAD TAPE DATA FOR REQUESTED FISSION TYPE INTO ABEGN
                                                                          PAH1 597
С
                                                                          PAH1 594
                                                                          PAH1 599
      00 316 I=1.12
      WEAD (INTP. 13) NAME
                                                                          PAHI 6. 0
```

```
IF (EOF (INTP) .NE. J.C) GO TO 307
                                                                           PAM1 601
      READ(INTP.14) (ABEGN(J).J=1.692)
                                                                           PAM1 602
        IF (NAME .EQ. FISSID) GO TO 308
                                                                           PAM1 603
  306 CONTINUE
                                                                           PAM1 604
  307 CONTINUE
                                                                           P4M1 605
      WRITE(KOUT.6001) FISSIO
                                                                           PAM1 636
 6001 FORMAT( 1HC. 8H FISSIC=A6, 18H NOT FOUND IN FILE)
                                                                           PAM1 637
       CALL ERROR (6H PAM1 ,-6001, ISOUT)
                                                                           PAM1 608
  368 REWIND INTP
                                                                           PAM1 609
      HSCL=HOB/TH**C.333333333
                                                                           PAM1 610
                                                                           PAM1 611
      IF (EMITN.LE.G.O) GC TO 100
                                                                           PAM1 612
C
      CONVERT HOB FROM METERS TO FEET.
                                                                           PAM1 613
                                                                           PAM1 614
      H08=H0B+3. 28C84
                                                                           PAM1 615
      HSCL=HSCL + 3.25084
                                                                           PAM1 616
      IF (HSCL.LT.36.0) GC TO 274
                                                                           PAM1 617
      ALBFOM=J.D
                                                                           PAM1 618
      GO TO 287
                                                                           PAM1 619
  274 IF (HSCL)276,277,275
                                                                           PAM1 620
  275 FOM=1.-HSCL/SQRT(4.24*HSCL*HSCL-234.*HSCL+4225.)
                                                                           PAM1 621
      GO TO 286
                                                                           PAM1 622
                                                                           PAM1 623
  276 IF (HSCL.LT.-2.C) GO TO 278
  277 FOM=1.0
                                                                           PAM1 624
      GO TO 286
                                                                           PAM1 625
  278 ALBFOM = 1.E4
                                                                           PAM1 626
      GO TO 287
                                                                           PAM1 627
  286 ALBFOM = ALBFOMFFOM
                                                                           PAM1 628
  287 ALBFOM = ALBFOM*EMITN
                                                                           PAM1 629
      GO TO 101
                                                                           PAM1 630
  100 LMAX= 1
                                                                           PAM1 631
  101 CONTINUE
                                                                           PAM1 632
      CALL FRATIO
                                                                           PAM1 633
                                                                           PAM1 634
          (SLOTHP , THSD
                           , MCHN
      RETURN
                                                                           PAM1 635
      END
                                                                           PAM1 636
```

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PAHZ
*DECK.PAM2
                                                                               PAME
      SUBROUTINE PAM2
                                                                               PAHZ
                                                                                       3
                                                                               PAM2
      R C TOMPKINS -- US ARMY NUCLEAR DEFENSE LAPS
    EXECUTIVE PROGRAM FOR THE TIME-DEPENDENT PART OF THE PARTICLE
                                                                               PA M2
                                                                               PAM2
      OCTOBER 1966
    ACTIVITY MODULE
                                                                               FAME
                                                                                       7
                                                                               PAMS
                                                                                       8
CALLED BY OPM2 AND PCHECK
                                                                                       9
                                                                               PAM2
                                                                               PAM2
                                                                                      10
                                 GLOSSARY
                                                                               PAM2
                                                                                      11
                    ACTIVITY DENSITY IN EACH PARTICLE SIZE FRACTION
                                                                               PAMP
                                                                                      12
C
    FP (230)
                    NUMBER OF PAFTICLE SIZE CLASSES
                                                                               PAM2
                                                                                      13
Ç
    ITAB
                    MASS NUMBER REQUESTED FOR OUTPUT WITH JGO = 2
                                                                               PA M2
                                                                                      14
    MA SCHN
                    FRACTION OF TOTAL SURFACE IN EACH PARTICLE SIZE CLASS
    SV (204)
                                                                               PAMZ
                                                                                      15
                    DIVIDED BY FRACTION OF TOTAL VOLUME
                                                                               PAM2
                                                                                      16
                                                                                      17
                                                                               PA M2
                                                                               PA M2
                                                                                      18
C
                                                                                PAM2
                                                                                      19
C
                                                                                PAH2
                                                                                      20
      COMMON /DECAY/ IGO, JC, KDOS, TENTER, TEXIT, TIME
      COMMON /FISHIN/ ABEGN(700), ABUNDO(700), BRANCH(130), CAPFIS,
                                                                               PAM2
                                                                                      21
        DCON(700), IBRA, INUC, MAXNUC, MULT(11), NUCLID(700)
                                                                               PAM2
                                                                                      22
      COMMON/INDUS/ALBFON, FAC(7,18), FOGRNY(7,18), ISO(18), LMAX, XLAH(7,18) PAM2
                                                                                      23
      COMMON /OUTPUT/ FISHUM, FF(200), FH, ITAB, JGO, MASCHN, PSIZE(200),
                                                                               PAM2
                                                                                      24
                                                                                PA M2
                                                                                      25
     1 FMASS(200), PACT(200)
                                                                               PAM2
      COMMON /UTILTY/ KCUT, NPRNT (15)
                                                                                      26
                                                                                PAM2
                                                                                      27
      LOGICAL IGO, JD, KDOS, NPRNT
                                                                                PAM2
                                                                                      28
C
  100 FORMAT( ////35x, 51HTABLE OF TOTAL ACTIVITY IN EACH PARTICLE SIZE PAM2
                                                                                      29
                 4(6X, 5HPSIZE, 10X, 2HFP, 5X))
                                                                                PAM2
                                                                                      30
     1CLASS//
  101 FORMAT( 8(1PE14.4))
                                                                                PAMZ
                                                                                      31
  102 FORMAT(1HD3X40HK FACTORS COMPUTED FROM THE FP TABLE +
                                                                        1PE 11 . 4PAM2
                                                                                      32
                                                                                PAM2
                                                                                      33
      1,27X,1PE11.4)
  103 FORMAT(1H+, 55X, 16H(R-M**2)/(HR-KT), 22X, 17H(R-MI**2)/(HR-KT))
                                                                                       34
                                                                                PA M2
                                                                                PAMZ
                                                                                      35
  104 FORMAT(1H+, 55X, 11H(R-M++2)/KT, 27X, 12H(R-MI++2)/KT)
                                                                                PAM2
                                                                                       36
C
                                                                                PAM2
                                                                                       37
       00 \ 10I = 1,200
   10 FP(I) = 0.0
                                                                                PAMZ
                                                                                       38
C
                                                                                PAM2
                                                                                       39
                                                                                       40
                                                                                PAM2
       GO TO (1,2,3), JGO
                                                                                PAM2
                                                                                       41
C
     1 CALL GXPSR
                                                                                PAMZ
                                                                                      42
       IF (CAPFIS: 3,3,4
                                                                                PAM2
                                                                                       43
     4 CALL URAN
                                                                                PAMZ
                                                                                       44
                                                                                PAM2
                                                                                       46
     3 IF (LMAX)5,5,6
     6 CALL INDOCZ
                                                                                PAME
                                                                                       46
      IF (NPRNT(15)) RETURN
                                                                                PAM2
                                                                                       47
                                                                                PAM2
                                                                                       40
       NTAB=ITAB/4
                                                                                PAM2
                                                                                       49
       IF(NTAB #4 .LT. ITAB) NTAB=NTAB+1
                                                                                PAM2
                                                                                       53
       WRITE (KOUT, 100)
       WRITE (KOUT, 101) (PSIZE(I), FP(I), PSIZE(I+NTAB), FF(I+NTAB),
                                                                                PAMZ
                                                                                       51
      1 PSIZE(I+2*NTAB),FF(I+2*NTAB),PSIZE(I+3*KTAB),FF(J+3*NTAG),I=1,
                                                                                PAM2
                                                                                       52
                                                                                FAHZ
                                                                                       53
      LEATH S
       IF (JGO .EQ. 2) RETURN
                                                                                PAH2
                                                                                       54
                                                                                       55
       CAYFAC= 1.0
                                                                                PAM2
                                                                                PHMZ
                                                                                       56
       00 7 I=1.IYA9
                                                                                PAH2
                                                                                       57
     7 CAYFAG= CAYFAC+FP(I)
       CAYFAC= CAYFAC/FH
                                                                                SHA9
                                                                                       58
                                                                                PAHZ
                                                                                       54
       CAYEA =CAYEAG = 3.861E=7
                                                                                U2H2
       HRITE(KOUF.102) CAYFAC.CAYFA
                                                                                       e fr
```

```
END
                                                                            PAH2
                                                                                   66
*DECK, FRATIO
                                                                            FRATI
                                                                            FRATI
      SUBROUTINE FPATIO
          (SLOTHP, THSD, HCHN)
                                                                            FRATI
                                                                            FRATI
C
C
      R C TOMPKINS -- US ARMY NUCLEAR CEFENSE LABS
                                                                            FRATI
                                                                            FRATI
      SEPTEMBER 1966
      REVISED NOVEMBER 1974
                                                                            FRATE
                                                                            FRATI
      COMMON /DECAY/ IGO, JC, KDOS, TENTER, TEXIT, TIME
                                                                            FRATI
                                                                            FRATI 10
      COMMON /FISHIN/ ABEGN(700), ABUNDO(700), BRANCH(130), GAPFIS.
        DCON(700), IBRA, INUC, MAXNUC, MULT(11), NUCLID(700)
                                                                            FRATI 11
      COMMON /FRYLNG/ 85UBK(90), ERM(185), JRM(185), KRM, ECF(90)
                                                                            FRATI 12
      COMMON /OUTPUT/ FISHUM, FF(200), FW, ITAB, JGO, HASCHN, PSIZE(200),
                                                                            FRATI 13
     1 FMASS(200). PACT(200)
                                                                            FRATI 14
                                                                            FRATI 15
      COMMON /UTILITY/ KUUT, NPRNT (15)
      LOGICAL IGO, JO, KDOS, NPRNT
                                                                             FRATI 16
      DIMENSION FR(90)
                                                                             FRATI 17
      DIMENSION BOIL (40)
                                                                             FRATI 16
C
                                                                             FRATI 19
      EQUIVALENCE (FR. BSUBK)
                                                                             FRATI 20
C
                                                                             FRATI 21
      LOGICAL NOTO
                                                                             FRATI 22
C
                                                                             FRATI 23
      DATA BOIL/243173.0,2907.0,3000.0,2976.4,1764.0,1010.0,1026.0,351.8FRATI 24
     1,120.1,1650.0,3497.0,4695.0,4808.0,33U0.0,1351.0,583.0,45U5.0,4149FRATI 25
     2.0,3436.0,2451.0,1832.G,2123.0,2247.0,1832.0,1534.0,457.4,165.9,15FRAYI 26
     355.0,3003.0,4608.0,4367.(,4252.0,4464.0,4348.0,5*4300.0/
                                                                            FRATI 27
                                                                             FRATI 28
Ç
C
                                                                             FRATI 29
      TIME = THSO
                                                                             FRATI 30
      IGO = . FALSE.
                                                                             FRATI 31
                                                                             FRATI 32
      JD = .TRUE.
      KDOS = .FALSE.
                                                                             FRATI 33
                                                                             FRATI 34
      MAXCHN = 90
      00 30 I = 1.MAXCHN
                                                                             FRATI 35
                                                                             FRATI 36
   30 FR(I) = 0.0
                                                                             FRATI 37
C
      CALL BATHAN
                                                                             FRATI 38
                                                                             FRATI 39
C
                                                                             FRATI 40
      MCHN = 0
      RFRC = 0.0
                                                                             FRATI 41
      CHN = 0.0
                                                                             FRATI 42
      LAST = IABS(NUCLID(1))/MULT(9)
                                                                             FRATI 43
                                                                             FRATI 44
      NOTO = "FALSE.
                                                                             FRATI 45
C
                                                                             FRATI 46
      00 10 MB = 1. INUC
                                                                             FRATI 47
      NAME = IABS(NUCLID(MB))/MULT(5)
      MASS = NAME/HULT(3)
                                                                             FRATI 48
      NAT = MODINAME, MULT (3))
                                                                             FHATI 49
```

PANZ

PAH2

PAMZ

PAH2

PAH2

61

62

63

64

65

IF(JO) WRITE(KOUT, 102)

RETURN

2 CALL MCHDEP

50 TO 5

IF(.NOT. JD) WRITE(KOUT,134)

The same of the state of the state of the same of the

```
IF (NAT.GE.27.AND.NAT.LE.66) GO TO 1
                                                                            FRATI 50
      WRITE (KOUT.513) NAT.MASS
                                                                            FRATI 51
      ABUND = U.O
                                                                            FRATI 52
      GO TO 10
                                                                            FRATI 53
    1 IF (MASS.EQ.LAST)GO TO 3
                                                                            FRATI 54
      MCHN = MCHN + 1
                                                                            FRATI 55
      IF (NOTO) FR(MCHN) = RFRC/CHN
                                                                            FRATI 56
      RFRC = 0.0
                                                                            FRATI 57
      CHN = 0.0
                                                                            FRATI 58
      NOTO = .FALSE.
                                                                            FRATI 59
    3 ABUNO = ABUNDO(MB)
                                                                            FRATI 60
                                                                            FRATI 61
      LAST = MASS
      IF (ABUND) 10, 18, 4
                                                                            FRATI 62
    4 NOTO = .TRUE.
                                                                            FRATI 63
      IF (BOIL(NAT-26).GE.SLOTMP) RFRC = RFRC + ABUND
                                                                            FRATI 64
      CHN = CHN + ABUND
                                                                            FRATI 65
   10 CONTINUE
                                                                            FRATI 66
      MCHN = MCHN + 1
                                                                            FRATI 67
      IF (NOTO) FR(MCHN) = RFRC/CHN
                                                                            FRATI 68
C
                                                                            FRATI 69
      IF (NPRNT(6)) GO TO 22
                                                                            FRATI 70
   19 00 32 L = 1, MCHN
                                                                            FRATI 71
      BSUBK(L) = SQRT(FR(L)) - 1.0
                                                                            FRATI 72
      POWER = BSUBK(L)
                                                                            FRATI 73
      SUM = 0.0
                                                                            FRATI 74
      00 20 M = 1.ITAB
                                                                            FRATI 75
   20 SUM = SUM + FMASS(M) *PSIZE(M) ** POWER
                                                                            FRATI 76
   32 ECF(L) = 1.0/SUM
                                                                            FRATI 77
      IF (NPRNT(7)) GO TO 23
                                                                            FRATI 78
   21 IGO = .TRUE.
                                                                            FRATI 79
      RETURN
                                                                            FRATI 80
   22 WRITE (KOUT,501)
                                                                            FRATI 81
      WRITE (KOUT, 502) (J, FR(J), J=1, MCHN)
                                                                            FRATI 82
      GQ TO 1.9
                                                                            FRATI 83
   23 WRITE (KOUT,503)
                                                                            FRATI 84
      WRITE (KOUT, 502) (K, esubk(K), K=1, MCHN)
                                                                            FRATI 85
      GO TO 21
                                                                            FRATI 86
      FORMAT (1H1, "OUTPUT OF FRATIO"/ 5(6X, 4HMCHN, 6X, 2HFR, 3X))
571
                                                                            FRATI 87
512
      FORMAT ( 5(7X, I2, 1PE12.4))
                                                                            FRATI 38
513
      FORMAT (///5 (6X,4HMCHN,4X,5HBSUBK,2X,)//)
                                                                            FRATI 89
  513 FORMAT (44HOBOILING FOINT IS NOT AVAILABLE FOR ELEMENT I3,
                                                                            FRATI 90
     1 6H(MASS I3,1H))
                                                                            FRATI 91
      END
                                                                            FRATI 92
```

```
BATHA
*UECK. BATMAN
      SUBROUTINE BATHAN
                                                                           BATHA
                                                                           BATHA
      VERSION 1
C
      R C TOMPKINS -- US ARMY NUCLEAR CEFENSE LAES
                                                                            BATHA
      AUGUST 1966
                                                                            BATHA
      REVISED BY P R JONES -- FEBRUARY 1969
                                                                           AMTAS
    THIS VERSION REPLACES SUBPOUTINES INGEN, BATHAN, DECAY, AND DOSE OF BATHA
    THE INITIAL VERSION OF DELFIC
                                                                            BATMA
                                                                            BATHA
                                                                            BATHA 10
С
    THE FUNCTION OF THIS SUBROUTINE IS TO COMPUTE RADICACTIVE DECAY
                                                                            BATMA 11
    CHAINS BY MEANS OF THE BATEMAN EQUATION
                                                                            BATHA 12
CALLED BY FRATIO, GXPSR, AND MCHDEP
                                                                            BATHA 13
                                                                            BATMA 14
                               GLOSSARY .
                                                                            BATMA 15
C
C
                   INITIAL FISSION PRODUCT ABUNCANCES IN ATOMS/13000
                                                                            BATHA 16
    ABEGN (700)
C
                   FISSIONS (PARALLEL TO NUCLID)
                                                                            BATMA 17
    43 UNDO (70 C)
                  FISSION PRODUCT ABUNCANCES PER 1556 FISSIONS
                                                                            BATMA 18
                                                                            BATMA 19
                  ATOMS AT THSC IN FRATIO
                   DISINTEGRATIONS/SEC AT TIME (JD=1)
                                                                            BATMA 20
                                                                            BATMA 21
С
                   DISINTEGRATIONS FROM TENTER TO TEXIT
                   OR INFINITY (JD=2)
                                                                            BATHA 22
C
                   CONTRIBUTION OF CHE SUBCHAIN TO ABLADO
                                                                            BATMA 23
    9(15)
C
                   BATEMAN COEFFICIENTS FOR ONE SUBCHAIN
                                                                            BATMA 24
    CN IJ (680)
                   COUNTER TO KEEP PLACE IN BRANCHING RATIO TABLE WHILE
                                                                            BATMA 25
    I8R
                   SCANNING NUCLIDE TABLE
                                                                            BATMA 25
                   ASSIGNED GOTO PARAMETER LURRESFONDING TO IGO
                                                                            BATMA 27
C
    IFIG0
                   ASSIGNED GOTO PARAMETER CORRESPONDING TO JO
                                                                            BATMA 28
C
    IFJD
                                                                            BATHA 29
C
    IGC
                   (LOGICAL) TRUE GIVES ACTIVITY,
                   FALSE GIVES ATOMIC ABUNDANCES
                                                                            SATMA 30
    INFORM(11)
                   TABLE OF DAUGHTER RETRIEVAL INFORMATION FOR EACH
                                                                            BATMA 31
                                                                            BATMA 32
С
                   MEMBER OF A SUBCHAIN, OBTAINED BY TRUNCATING NUCLID
C
                                                                            BATMA 33
                   FROM THE LEFT
                   (LOGICAL) TRUE COMPUTES EXPOSURE RATE,
                                                                            BATMA 34
    JD
                   FALSE COPPUTES DOSE
                                                                            BATMA 55
                   (LOGICAL) TRUE COMPUTES DOSE FROM TENTER TO TEXIT,
                                                                            BATMA 36
С
    KDOS
                   FALSE COMPUTES DOSE FROM TENTER TO INFINITY
                                                                            BATMA 37
                                                                            BATMA 38
    KF JD
                   SEE IFJO
                                                                            BATMA 39
    LIM(11)
                   SUBCHAIN TABLE OF INDICES FOR PULT TO FIND CURRENT
                   BRANCHING PATH
                                                                            BATMA 4U
                   COUNTER FOR SUBCHAIN MEMBERS
                                                                            BATMA 41
    LSUB
                   CROSS REFERENCE OF SUBCHAIN MEMBERS TO INDEX IN NUCLIDBATHA 42
    NUC(11)
    SBR (11)
                   SUBCHAIN BRANCHING RATIOS
                                                                            BATMA 43
                   FISSION YIELDS OF SUBCHAIN MEMBERS
    SCA (15)
                                                                            BATMA 44
                   DISINTEGRATION CONSTANTS OF SUBCHAIN MEMBERS
                                                                            BATMA 45
C
    SDC(15)
С
    TENTER
                   ENTRY TIME (SEC) FOR DOSE CALCULATION WITH JO = FALSE BATMA 46
    TEXIT
                   EXIT TIME (SEC) FOR DOSE CALCULATION
                                                                            BATMA 47
Ç
                   WITH JD = FALSE, KDOS = TRUE
                                                                            BATMA 48
                   TIME (SEC) AT WHICH EXPOSURE RATE OF MASS CHAIN
                                                                            BATMA 49
С
    TIME
                   DEPOSITE IS CALCULATED WITH JU = TRUE
                                                                            BATHA 50
C
C
                                                                            BATMA 51
                                                                            BATHA 52
C
      COMMON /JECAY/ IGO, JO, KDCS, TENTER, TEXIT, TIME
                                                                            BATMA 53
      COMMON /FISHIN/ ABEGN(700),ABUNDC(702),BKANCH(131),CAPFIS,
                                                                            BATMA 54
     1 OCON(7:0), IBRA, INUC, MAXNUC, HULT(11), NUCLID(7:1)
                                                                            81TMA 55
      COMMON JUTILITY KOUT, NPPNT (15)
                                                                            BATMA 56
      LOGICAL IGO. JD. KDOS. NPRNT
                                                                            BATMA 57
      DIMENSIUM EFAC (11) . KBR
                                                                            BATHA 58
                                      (11)
                 . INFORMELLI
                              ·LI4
                                      (11)
                                            . NUC
                                                    (11)
                                                          · Sur
                                                                 (11)
                                                                            BATMA 59
                                                                            BATMA 60
                              .500
                                      4 1 1 1
```

ditional and the world of the state of the s

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C
                                                                           BATMA 61
      LOGICAL FLAG
                                                                           BATMA 62
                                                                            BATMA 63
CC
    SET INITIAL VALUES
                                                                           BATMA 64
      no 1 I = 1, INUC
                                                                           BATMA 65
                                                                           BATMA 66
    1 ABUNDO(I) = G \cdot 0
      IBR = 0
                                                                           BATHA 67
C
                                                                           BATMA 68
   BEGIN MAIN LOOP THROUGH THE NUCLIDE TABLE
                                                                           BATMA 69
                                                                           BATMA 70
                                                                           BATMA 71
   10 DO 500 IN = 1.INUC
    FIND THE NEXT NUCLIDE THAT BEGINS A SUBCHAIN
C
                                                                           BATHA 72
      IF (NUCLID(IN))11,500,499
                                                                           BATMA 73
                                                                            BATMA 74
    SET PARAMETERS FOR BEGINNING OF A BUBCHAIN
                                                                           BATMA 75
          MEMBERSHIP COUNTER
                                                                            BATHA 76
                                                                            BATMA 77
   11 LSUB = 1
          BRANCHING RATIC COUNTER
                                                                            BATMA 78
      LBR = IBR
                                                                            BATMA 79
                                                                            BATMA 80
      KBR(1) = LBR
          STARTING INDEX
                                                                            BATMA 81
C
      NUC(1) = IN
                                                                            BATMA 82
   12 LIN(LSUB) = 4
                                                                            BATMA 33
    PROCESS A SUBCHAIN MEMBER
                                                                            BATMA 84
   13 KP = NUC(LSUB)
                                                                            RATMA 85
                                                                            BATM# 86
      IM = LIM(LSUB)
      INFO = MOD(IABS(NUCLID(KP)), MULT(5))
                                                                            BATMA 87
      INFORM(LSUB) = INFC
                                                                            BATHA 88
      INC = 1
                                                                            BATHA 89
    SET UP SUBCHAIN DISINTEGRATION CONSTANTS
                                                                            BATHA 90
      SDC(LSUB) = DCON(KP)
                                                                            BATMA 91
CHECK FOR END OF SUBCHAIN
                                                                            BATMA 92
      IF (INFO.EQ.4) GO TO 21
                                                                            BATMA 93
CHECK FOR BRANCHING
                                                                            BATMA 94
      IF (MOD(TNFO, MULT(1)).LT.4) GO TO 14
                                                                            BATMA 95
      SBR(LSU3) = 1.0
                                                                            BATMA 36
      GO TO 15
                                                                            BATMA 97
    SET UP SUBCHAIN BRANCHING RATIOS
                                                                            BATMA 98
   14 LB = LBR + 5 - IM
                                                                            BATMA 99
      SBR (LSUB) = BRANCH(LB)
                                                                            BATMA1J0
    EXTRACT THE DAUGHTER INCREMENT
                                                                            BATM#101
   15 ID = MOD(INFO, MULT(IN+1))/MULT(IM)
                                                                            BATMA102
    SEE IF THIS INCREMENT SHOULD BE NEGATIVE
                                                                            BATHA1.3
      IF (MOD(INFO, MULT(2) )/MULT(1).EQ.IM) GO TO 16
                                                                            BATHA164
    SET PARAMETER TO LOOK AHEAD FOR BRANCHING RATIC OF DAUGHTER
                                                                            BATMA1J5
      KI = KP
                                                                            BATMA116
                                                                            BATMA117
      GO TO 17
    SET PARAMETER TO LOOK BEHIND FOR BRANCHING RATIO OF DAUGHTER
   1 ( KI = 1
      LBR = 0
                                                                            BATMA110
      INC = -INC
                                                                            BATHALLE
COMPUTE DAUGHTER INDEX
                                                                            BATMALLE
   17 NDAUT = KP + INC*ID
                                                                            BATMA1:3
      KDA = NDAUT - 1
                                                                            SATMA114
    STEP THROUGH THE NUCLIDE TABLE TO ESTABLISH THE CORRECT INDEX FOR
                                                                            BATHA115
    THE BRANCHING RATIO OF THE DAUGHTER
                                                                            3ATNA116
      DO 20 K = KI.KDA
                                                                            BATMA117
   20 LBR = LBR + 4 - IABS (MOD (NUCLIU(K), MULT(18))
      KARILSUA+1, = LBR
                                                                            BATHMILL
                                                                            64TM#121
C
```

```
ACCEPT THE DAUGHTER FOR MEMBERSHIP IN THE SUBCHAIN AND RECYCLE
                                                                           BATHA121
      LSUB = LSUB + 1
                                                                           BATHA122
      IF (LSUB.GT.11) GO TC 1301
                                                                           BATHA123
                                                                           BATHA124
      NUC(LSUB) = NDAUT
      GO TO 12
                                                                           BATHA125
C
                                                                           BATMA126
CC A SUBCHAIN HAS NOW BEEN SET UP AND CAN BE STUDIED IN TOTO
                                                                           BATMA127
    ELIMINATE UNI-MEMBERED SUBCHAIN
                                                                           BATHA128
   21 IF (LSUB.EQ.1) GO TO 500
                                                                           BATHA129
    RUN BACK THROUGH THE SUBCHAIN TO ACCUMULATE BRANCHING RATIOS
                                                                           BATHA130
                                                                           BATMA131
      ASSIGN 23 TO LGU
                                                                           BATHA132
      JL = 0
      SCA(LSUB) = 1.0
                                                                           BATMA133
                                                                           BATMA134
      LAST = LSUB + 1
      DO 22 L = 2,LSUB
                                                                           BATMA135
      LBACK = LAST - L
                                                                           BATHA136
      SCA(LBACK) = 1.0
                                                                           BATHA137
                                                                           BATHA138
      GO TO LGO, (22, 23)
                                                                           BATMA139
    FIND THE LAST BRANCH IN THE SUBCHAIN
                                                                           BATMA140
   23 IM = LIM(LBACK)
      IF (MOD (INFORM (LBACK), MULT (IM))/MULT (IM-1)) 22, 22,24
                                                                           BATMA141
   24 JL = LBACK
                                                                           BATMA142
      ASSIGN 22 TO LGO
                                                                           BATMA143
   22 SCA(LBACK) = SBR(LDACK) + SCA(LBACK+1)
                                                                           BATMA144
      SCA(USUB) = 0.0
                                                                           BATMA145
                                                                           BATMA146
CORRECT FISSION YIELDS FOR BRANCHING
                                                                           BATMA147
      FLAG = .FALSE.
      DO 25 J = 1.LSUB
                                                                           GATMA148
      JN = NUC(J)
                                                                           BATMA149
      SCA(J) = SCA(J) *ABEGN(JN)
                                                                           BATMA150
      IF (FLAG) GO TO 25
                                                                           BATHA151
    MAKE A NOTE IF A' LEAST ONE VALUE OF SCA IS NONTRIVIAL
                                                                           BATMA152
      IF (SCA(J))25,25,27
                                                                           CATMA153
                                                                           BATMA154
   27 FLAG = .TRUE.
                                                                           BATMA155
   25 CONTINUE
                                                                           BATMA156
    CMIT COMPUTATIONS FOR TRIVIAL SUBCHAIN
                                                                           BATMA157
С
      IF (.NOT.FLAG) GO TO 30
                                                                           BATMA158
                                                                           BATMA159
CC THE CENTRAL COMPUTATIONS BEGIN AT THIS PCINY
                                                                           BATMA160
                                                                           BATMA161
                                                                           BATMA162
      DO 200 N=1, LSU9
                                                                           BATMA163
      IF(JD) TENTER=TIME
      EFAC(N) =EXP(-SDC(N) *TENTER)
                                                                           BATMA164
      IF(KDOS) EFAC(N) = EFAC(N)-EXP(-SDC(N)^TEXIT)
                                                                           BATMA165
                                                                            BATMA166
      B=3.0
      DO 163 K1=1+N
                                                                           BATMALET
      CNI J=1 , 0
                                                                           BATMA168
                                                                           BATMA169
      Q=0.0
                                                                           BATHA170
      00 162 K=1.N
                                                                           BATMA1/1
      K2mN-K+1
                                                                           BATMA172
      IF(K2.NE.N) CNIJ=CNIJ*SOC(K2)
      IF(K2.EQ.K1) GO TO 162
                                                                           BATMA173
      FACTC=SDC(K2)-SDC(K1)
                                                                           BATMA174
      IF (ABS1FACTC) -LT -1 (E-15) FACT G=SIGN(1 - E-15 - FACTC)
                                                                            BATMA175
      CHI J=CHIJ/F ACTC
                                                                            BATMAL76
  162 IFIK2.LE.KIND=Q+CNIJ*SCA(KZ)
                                                                            9ATHA177
                                                                            BATHA178
       IF(JO) GO TO 163
                                                                            BATMA179
       IF (STOCKE) LEGISCO GO TO 153
                                                                            BATH AL 90
       Q#3/50C (K1)
```

M 1975 E M 1

```
163 B=8+Q*EFAC(K1)
                                                                           BATMA181
      IF(8.LE.J.C) GO TO 200
                                                                           BATMA182
      IF(IGO) B=B*SDC(N)
                                                                           BATM #183
      NK=NUC(N)
                                                                           BATMA184
                                                                           BATMA185
      ABUNDO(NK) = ABUNDO(NK) +B
  200 CONTINUE
                                                                           BATMA186
C
                                                                           BATM 4187
    SET UP A NEW SUBCHAIN STARTING FROM DEEPEST UNEXFLORED BRANCH
                                                                            BATMA188
   39 IF (JL)508,499,31
                                                                           BATMA189
   31 LSUB = JL
                                                                            BATMA190
      LIM(LSUB) = LIM(LSUB) - i
                                                                            BATMA191
      LBR = KBR(LSUB)
                                                                           BATHA192
      GO TO 13
                                                                            BATHA193
C
                                                                           BATMA194
                                                                            BATMA195
 1301
             WRITE (KOUT, 1351) NUCLID(IN)
                                                                            BATMA196
C
                                                                            BATMA197
    STEP UP BRANCH COUNTER IN MAIN LOOP
                                                                            BATMA198
  499 JBR = IBR + 4 - MOC(IABS(NUCLID(IN)), MULT(1))
                                                                            BATMA199
  500 CONTINUE
                                                                            BATMA200
      IF (NPRNT(9)) WRITE (KOUT, 1000) (NUCLID(I), AEUNDO(I), I=1, INUC)
                                                                            BATMA201
      RETURN
                                                                            BATMA202
 1000 FORMAT (17H10UTPUT OF BATMAN//8X6HNUCLID11X6HABUNDO/
                                                                            BATMA 233
          (5X012,5X1PE12,4))
                                                                            BATMA204
 1351 FORMAT (25H0SUBCHAIN BEGINNING WITH 012,8H YOU BIG)
                                                                            BATMA205
      FND
                                                                            BATMA206
```

```
GXPSR
*DECK, GXPSR
                                                                             GXPSR
      SUBROUTINE GXPSR
                                                                             GXPSR
C
С
      CASSIDY - NRDL / TCPFKINS - NOL
                                                                             GXPSR
                                                                             GXPSR
      NOVEMBER 1966
                                                                             GXPSR
CALLED BY PAM2
                                                                             GXPSR
      COMMON /DECAY/ IGO, JC, KDOS, TENTER, TEXIT, TIME
                                                                             GXPSR
                                                                                     8
      COMMON /FISHIN/ ABEGN(700), ABUNDO(700), BRANCH(130), CAPFIS,
                                                                             GXPSR
                                                                                     9
     1 DCON(733), IBRA, INUC, MA XNUC, MULT(11), NUCLID(7 00)
                                                                             GXPSR 10
      COMMON /FRYLNG/ BSUEK(90), ERM(185), JRM(185), KRM, ECF(90)
                                                                             GXPSR 11
      COMMON /OUTPUT/ FISHUM, FF(200), FW, ITAB, JGO, MASCHN, PSIZE(200),
                                                                             GXPSR 12
     1 FMASS(200),PACT(200)
                                                                             GXPSR 13
      COMMON /UTILITY/ KOUT, NPRNT (15)
                                                                             GXPSR 14
      LOGICAL IGO. JD. KDOS. NPRNT
                                                                             GXPSR 15
                                                                             GXPSR 16
C
      DIMENSION XRT (90)
                                                                             GXPSR 17
C
                                                                             GXPSR 18
                                                                             GXPSR 19
      DATA CROSS.UNIT/1.3E-4,1.0/
                                                                             GXPSR 20
  901 FORMAT
                                                                             GXPSR 21
          (16H1OUTPUT OF GXPSR/5X13HPARTICLE SIZE/X24HFISSION PROCUCT ACGXPSR 22
     1
                                                                             GXPSR 23
     (VIIVITS
                                                                             GXFSR 24
  902 FORMAT
          (AX7H HETERS16X11H(R*M**2)/HR//)
                                                                             GXPSK 25
  TAMPCE EUP
                                                                             GKPSK 26
                                                                             GKHSR 27
          (5x1PE12.4,14XE12.4)
                                                                             GKFSR 28
  915 F0244T
          LOXIN METERS LECEMPONOPS//!
                                                                             GHESK 29
```

```
C
                                                                             GXPSR 30
       CALL BATMAN
                                                                            GXPSR 31
       MAXMCH = 90
                                                                            GXPSR 32
       MCH = 0
                                                                             GXPSR 33
       DO 1 I = 1.MAXMCH
                                                                             GXPSR 34
    1 XRT(I) = 0.0
                                                                             GXPSR 35
C
                                                                            GXPSR 36
       00 13 J = 1.KRM
                                                                            GXPSR 37
       K = JRM(J)
                                                                            GXPSR 38
       IF (ERM(J))11,10,12
                                                                            GXPSR 39
   11 MCH = MCH + 1
                                                                            GXFSR 40
COMPUTE MASS CHAIN NORMALIZATION FACTOR
                                                                            GXPSR 41
                                                                            GXPSR 42
   12 XRT (MCH) = XRT (MCH) + ABUNDO(K) *ABS(ERM(J))
                                                                            GXPSR 43
С
                                                                            GXPSR 44
   10 CONTINUE
                                                                            GXPSR 45
C
                                                                            GXPSR 45
      DO 20 LC = 1,MCH
                                                                            GXPSR 47
      IF (XRT(LC))20,20,21
                                                                            GXPSR 48
   21 BNEX = BSUBK(LC)
                                                                            GXPSR 49
      CRISS = CROSS**BNEX
                                                                            GXPSR 50
      RADIAL = ECF(LC)/(UNIT + CKISS*ECF(LC))
                                                                            GXPSR 51
      STRAIT = RADIAL*CRISS
                                                                            GXPSR 52
      TNEX = FISNUM*XRT(LC)
                                                                            GXPSR 53
      DO 40 LD = 1. ITAB
                                                                            GXPSR 54
   40 FP(LD) = FP(LD) + (RADIAL*PSIZE(LD)**BNEX + STRAIT)*TNEX*FMASS(LD)GXPSR 55
   20 CONTINUE
                                                                            GXPSR 56
C
                                                                            GXPSR 57
C
                                                                            GXPSR 56
      IF (.NOT.NPRNT(10)) FETURN
                                                                            GXPSR 59
C
                                                                            GXPSR 60
      WRITE (KOUT,961)
                                                                            GXPSR 61
      IF (JO) GO TO 101
                                                                            GXPSR 62
      WRITE (KOUT,912)
                                                                            GXPSR 63
      GO TO 102
                                                                            GXPSR 64
  101 WRITE (KOUT, 902)
                                                                            GXPSR 65
  102 CONTINUE
                                                                            GXPSR 66
      DO 133 I=1. IT AB
                                                                            GXPSR 67
      WRITE (KOUT, 903) PSIZE(I), FP(I)
                                                                            GXPSR 68
  103 CONTINUE
                                                                            GXPSR 69
C
                                                                            GXPSR 70
      RETURN
                                                                            GXPSR 71
      END
                                                                            GXPSR 72
```

. **

```
UPAN
*DECK JURAN
                                                                               URAN
      SUBROUTINE URAN
                                                                                       2
                                                                               URAN
                                                                                       3
      R C TOMPKINS - US ARMY NUCLEAR DEFENSE LABS
C
                                                                               UR AN
                                                                                       4
                                                                               URAN
                                                                                       5
      MAY 1906
                                                                               UR AN
CALLED BY PAM2
                                                                                       6
                                                                               URAN
                                                                                       7
C
                    DISINTEGRATION CONSTANT OF NP233
                                                                               UPAN
C
    DLAM
                                                                                       8
                                                                               URAN
    PLAM
                    DISINTEGRATION CONSTANT OF U239
                                                                                       q
                                                                               UR AN
                                                                                      10
      COMMON / DECAY/ IGO, JD, KDOS, TENTER, TEXIT, TIM?
                                                                               URAN
                                                                                      11
                                                                               UPAN
      COMMON /FISHIN ASESN (700), ASUNDO (700), BRANCH (130), CAPFIS,
                                                                                      12
     1 DCON(700), IBRA, INUC, MAXNUC, MULT(11), NUCLID(700)
                                                                               UPAN
                                                                                      13
                                                                               URAN
      COMMON YOUTPUTY FISHUM, FP(2)), FH, ITAB, JGO, MASCHN, PSIZE (20)),
                                                                                      14
                                                                               URAN
     1 FHASS(200), PACT(200)
                                                                                      15
                                                                               URAN
      COMMON / UTILTY/ KOUT, NPRNT (15)
                                                                                      16
      LOGICAL IGO, JO, KDOS, NPRNT
                                                                               URAN
                                                                                      17
                                                                               URAN
                                                                                      18
      PLAM = 0.693147/(23.5*60.0)
                                                                               UPAN
                                                                                      19
                                                                               UPAN
COMPUTE NP233 DISINTEGRATION CONSTANT
                                                                                      20
COMPUTE U239 DISINTEGRATION CONSTANT
                                                                               URAN
                                                                                      21
      DLAM = 0.693147/(56.043630.3)
                                                                               URAN
                                                                                      22
                                                                               UPAN
                                                                                      23
    2 AZERO - CAPFIS'1.E4'PLAM
                                                                               URAN
                                                                                      24
      GLMP = DLAM/ (DLAM - PLAM)
                                                                               UPAN
                                                                                      25
                                                                               URAN
      GLUMP = AZERO*3LMP
                                                                                      26
                                                                               UPAN
                                                                                      27
C
                                                                               UPAN
                                                                                      28
      IF (.NOT.JO) GO TO 3
      ABURAN = AZERO' EXP (-PLAMFTIME)
                                                                               URAN
                                                                                      29
      ABNEP : GLMP*ABURAN - GLUMP*EXP (-DLAM*TIME)
                                                                               URAN
                                                                                      30
                                                                               No VN
                                                                                      31
      GO TO 7
                                                                               UPAN
                                                                                      32
C
    3 IF (.NOT.KDOS) GO TO 4
                                                                               URAN
                                                                                      .7 3
                                                                                      34
       ABURAN = AZERO/PLAMI(EXP (-PLAMMTENTER) - EXP (-PLAMMTEXITE)
                                                                               URAN
      ABNEP = GLMP#APURAN -
                                                                               UPAN
                                                                                      35
     IGLUMP*(EXP (-DLAM*TENTER) - EXP (-DLAM*TEXIT))/DLAM
                                                                               URAN
                                                                                      36
                                                                                URAN
                                                                                      37
      GO TO 7
                                                                                URAN
                                                                                      38
C
    4 ABURAN = AZERO/PLAMYEXP (-PLAMFTENTER)
                                                                               UPAN
                                                                                      39
                                                                               URAN
                                                                                      40
       ABNEP = GLMP*AJURAN - GLUYP/JLAM*EXP (+DLAM*TENTER)
                                                                                UPAN
                                                                                      41
    7 ANTP = (ABURAN*.327E-6 + 43NEP*.966E-6)*FISNUM
                                                                                UPAN
                                                                                      42
                                                                                UPAN
       DO & J=1.ITAB
                                                                                      43
    8 \text{ FP(J)} = \text{FP(J)} + \text{ANEP+FMASS(J)}
                                                                                URAN
                                                                                      4
                                                                                URAN
                                                                                      45
       IF (NPRNT(12)) WRITE (KUUT, 1,10) ANEP
                                                                                UPAN
                                                                                      46
  100 FORMAT
                                                                                UPAN
                                                                                      47
                                                                                UPAN
           (13H1OUTPUT OF JPAN/5x21 HMASS 239 CONTRIBUTES 12E1244.
                                                                                      48
           234 TO EACH PARTICLE SIZE.)
                                                                                URAN
                                                                                      49
                                                                                WAFU
                                                                                      e 0
       RETURN
                                                                                      ¢ 1
       END
                                                                                UPAN
```

. . .

```
*JECK.INDCD2
                                                                              INDCD
      SUBROUTINE INDCO2
                                                                               INDCD
C
                                                                               DOGNI
                                                                                      3
      NOVEMBER 1966
C
                                                                               INDCD
      COMMON / DECAY/ IGO, JD, KDOS, TENTER, TEXIT, TIME
                                                                               INDCD
      COMMON/INDUS/ALBFOM, FAC(7,18), FOGRNY(7,18), ISO(18), LMAX, XL4H(7, 18) INDCD
      COMMON /OUTPUT/ FISHUM, FP(200), FW, ITAB, JGO, MASCHN, PSIZE(20)),
     1 FMASS(200), PACT(200)
                                                                               INDCD
      COMMON /UTILTY/ KOUT, NPRNT(15)
                                                                                      9
                                                                               INDCD
      LOGICAL IGO, JD, KDOS, NPRNT
                                                                               INDCD 10
                                                                               INDCD 11
 1000 FORNAT
                                                                               INDCD 12
           (17H1OUTPUT OF INDCD2/5453HINDUCED ACTIVITY IN THE TRANSPORTEDINDCD 13
     2 SOIL CONTRIBUTES 1PE12.4,23H TO EACH PARTICLE SIZE.)
                                                                               INDCD 14
                                                                               INDCO 15
      SDRE = 0.0
                                                                               INDCO 16
C
                                                                               INDCD 17
      DO 24 L = 1. LMAX
                                                                               INDCD 18
      IS = ISO(L)
                                                                               INDCD 19
                                                                               INDCD 20
      00 22 I = 1. IS
                                                                               TNOCD 21
      DLAM = -XLAM(I, L)
                                                                               INDCD 22
      IF (.NOT.JD) GO TO 12
                                                                               1NDCD 23
      DRI = -FAC(I,L) +DLAM+ FOGRNY(I,L) +EXP(DLAM+TIME)
                                                                               INDCD 24
      GO TO ∠2
                                                                               IMDC0 25
C
                                                                               INDCD 26
   12 IF (.NOT.KDOS) GO TO 14
                                                                               INDCD 27
      DRI = FAC(I, L) FOGRNY(I, L) (EXP(DLAM*TENTER) - EXP(DLAM*TE(IT))
                                                                               INDCD 28
      GO TO 22
                                                                               INDC0 29
                                                                               INDCD 30
   14 DRI = FAC(I, L) * FOGRNY(I, L) * EXP(DLAM*TENTER)
                                                                               INDCD 31
                                                                               INDCD 32
   22 SDRE = SDRE + DPI
                                                                               INOCO 33
   24 CONTINUE
                                                                               INDCO 34
                                                                               INDCD 35
C
                                                                               INDCD 36
      SDRE = SDRE# ALBF OM* FISNUM
                                                                               INDCD 37
C
                                                                               INDCD 38
      DO 26 MA = 1.TTAB
                                                                               INDCD 19
   26 \text{ FP(HA)} = \text{FP(MA)} + \text{SDRE*FMASS(MA)}
                                                                               INDCD 40
                                                                               INDCD 41
       IF (NPRNT(11)) WRITE (KOUT, 1003) SDRE
                                                                               INDCD 42
      RETURN
                                                                               INDCD 43
       END
                                                                               INDCD 44
```

```
*DECK, MCHDEP
                                                                            HCHDE
      SUBROUTINE MCHDEP
                                                                            MCHDE
                                                                            MCHDE
C
         R C TOMPKINS - US ARMY NUCLEAR DEFENSE LABS
                                                                            MCHDE
       NOVEMBER 1966
C
                                                                            MCHDE
                                                                                   5
CALLED BY PAM2
                                                                            MCHDE
                                                                                   6
                                                                            MCHDE
      COMMON /DECAY/ 1GO, JC, KDOS, TENTER, TEXIT, TIME
                                                                            MCHDE
      COMMON /FISHIN/ ABEGN(700), ABUNDO(700), BRANCH(130), CAPFIS,
                                                                            MCHDE
                                                                                   9
        DCON(700), IBRA, INUC, MAXNUC, MULT(11), NUCLID(7J0)
                                                                            MCHDE 10
                                                                            MCHDE 11
      COMMON /FRYLNG/ BSUBK(90), ERN(185), JRM(185), KRM, ECF(90)
                                                                            MCHDE 12
      COMMON /OUTPUT/ FISHLM, FF(200), FW, ITAB, JGO, MASCHN, PSIZE(200),
     1 FMASS(230), PACT(203)
                                                                            MCHDE 13
      COMMON /UTILITY/ KCUT. KPRNT(15)
                                                                            MCHDE 14
                                                                            MCHDE 15
      LOGICAL IGO, JD, KOOS, NPRNT
                                                                            MCHDE 16
C
                                                                            MCHDE 17
      DIMENSION FHTA ( 7), FHTB(10)
C
                                                                            MCHDE 18
      LOGICAL TZERO, TMINUS
                                                                            MCHDE 19
C
                                                                            MCHDE 20
      DATA (FMTA(I), I=1,6) /10H(/14X31H T, 10HOTAL ABUND, 10HANGE OF MA, MCHDE 21
                                                                            HCHDE 22
     1 13HSS CHAIN I, 10H3,4H WAS 1, 10HPE12.5,9H /,
     2 (FMTB(I), I=1,9)/10+(17H1OUTPU, 10HT OF MCHDE, 16HP///5%13HP,
                                                                            MCHDE 23
     3 10 HARTICLE SI, 10 HZE6X22HACT, 10 HIVITY OF M, 10 HASS CHAINI,
                                                                            MCHDE 24
     4 10H4/9X6HNETE, 10HRS18X, 9H /,
                                                                            MCHDE 25
     5 UNITC/ 10HCURIES ///, UNITF/ 10HFISSIONS///
                                                                            MCHDE 26
      DATA GROSS.UNIT/1.0E-4,1.0/
                                                                            MCHDE 27
                                                                            MCHDE 28
  903 FORMAT
                                                                            MCHDE 29
                                                                            MCHDE 36
          (5X1PE12.4,14X E12.4)
     1
                                                                            MCHDE 31
C
                                                                            MCHDE 32
      TZERO = .FALSE.
      TMINUS = .FALSE.
                                                                            KCHDE 33
                                                                            MCHDE 34
      FMTA(7) = UNITC
                                                                            MCHDE 35
      FMTB(10) = UNITC
      IF (TIME)11.1.2
                                                                            MCHDE 36
    1 TZERO = .TRUE.
                                                                            MCHDE 37
COMPUTE EQUIVALENT FISSIONS
                                                                            MCHDE 38
                                                                            MCHDE 39
      ABNDM = 1.0
                                                                            MCHDE 40
      FISNUM = FISNUM#1.E4
      FMTA(7) = UNITF
                                                                            MCHDE 41
      FMTB(10) = UNITF
                                                                            MCHDE 42
    2 IF (NPRNT(13)) WRITE (KOUT, FMTB) MASCHN
                                                                            MCHDE 43
      IF (TZERO) GO TO 13
                                                                            MUHDE 44
COMPUTE ACTIVITY IN CURIES
                                                                            MCHDE 45
      CALL BATMAN
                                                                            MCHDE 46
      ABNDY = J. 0
                                                                            MCHDE 47
      DO 220 K1=1.INUC
                                                                            MCHDE 48
      IF(MASCHN.NE.IABS(NUCLID(K1))/MULT/9)) GC TO 220
                                                                            HCHDE 49
      SUM THE ACTIVITIES IN ONE MASS CHAIN AND CONVERT TO CURIES
                                                                            MCHDE 50
      ABNOM = ABNOM + ABUNCO(K1)
                                                                            HCHDE
                                                                                  51
  220 CONTINUE
                                                                            MCHDE 52
      ABNOM = ABNOM/3.7E10
                                                                            MCHDE 53
                                                                            MCHOE 54
C
                                                                            MCHDE 55
      IF (ABNDM) 9,9,10
C
      THE REST IS AN ABRICGEMENT OF GXFSR
                                                                            MCHDE 56
   10 BNEX = BSUB" (MASCHN-71)
                                                                            MCHDE 57
                                                                            MCHDE 58
      CRISS = CRCSS**BNEX
      RADIAL = ECF(MASCHN-71)/(UNIT + CRISS*ECF(MASCHN-71))
                                                                            MCHDE 59
                                                                            MCHDE 60
      STRAIT = RADIAL*CRISS
```

the and the second of the seco

	134	DO DS FP IF WR 1	BNDM = ABNOM*FISNUM 10 134 LD = 1,ITAB ISR = (RADIAL*PSIZE(LD) **BNEX + STRAIT) *ABNOM*FMASS(LD) IP(LD) = FP(LD) + OSR IF (,NOT.NPRNT(13)) GO TO 9 IRITE (KOUT,903) (PSIZE(I),FP(I),I=1,ITAB) IRITE (KOUT,FNTA) MASCHN,ABNOM											MCHDE 63 MCHDE 63 MCHDE 64 MCHDE 64 MCHDE 66 MCHDE 66 MCHDE 66 MCHDE 66	62 63 64 65 66 67 68											
C	*	₽	* *	₹N ¥	₹	¥	*	C	3 C E	INS	ERT	IGN	P	CINT		*	*	*	*	*	*	*	*		MCHDE	71
	11		II NI ET UI			. T	RUE.																		MCHDE MCHDE MCHDE	73
C	*	# E1	≠ ND		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	MCHDE MCHDE	

APPENDIX A

STRUCTURE AND SPECIFICATION OF THE HORIZONTAL RESOLUTION NET FOR HORIZONTALLY NONHOMOGENEOUS WIND AND TURBULENCE FIELDS

All wind and turbulence fields are resolved in the vertical in terms of strata in each of which unique data are specified. In most cases the fields are taken to be horizontally homogeneous,* but occasionally a situation occurs where it is important to account for variation with geographical location, particularly with regard to the winds. Then it is necessary to spatially resolve the wind field in the horizontal. In DELFIC this horizontal resolution is identical in each vertical stratum so that the remainder of this discussion involves only the two horizontal dimensions.

A rectangular "control" net, oriented with its axes in the west-to-east and south-to-north directions, \times and y respectively, with square mesh of spacing WINT, its southwest corner at point (XLLC,YLLC), and with numbers ICX and JCX of mesh units in the x and y directions respectively is specified by the user (DTM cards 3 and 4). Figure A.1 illustrates a case with ICX = ξ and JCX = 3.

Each one of the control net mesh units may be quartered, and each quarter may be quartered, etc. Information as to whether or not quartering occurs is contained in an array NET(ICX,JCX): if a mesh is not quartered, a positive integer, which serves as an index to the data arrays, is contained in the appropriate NET entry, but if the mesh is quartered, NET contains a negative integer which when set positive is the index to another array NETSU(NCX). For each quartered control mesh or submesh, NETSU contains

A horizontally homogeneous field is one in which the field property may vary with horizontal direction (e.g., a vector field such as a wind field) but which is constant along any directional axis.

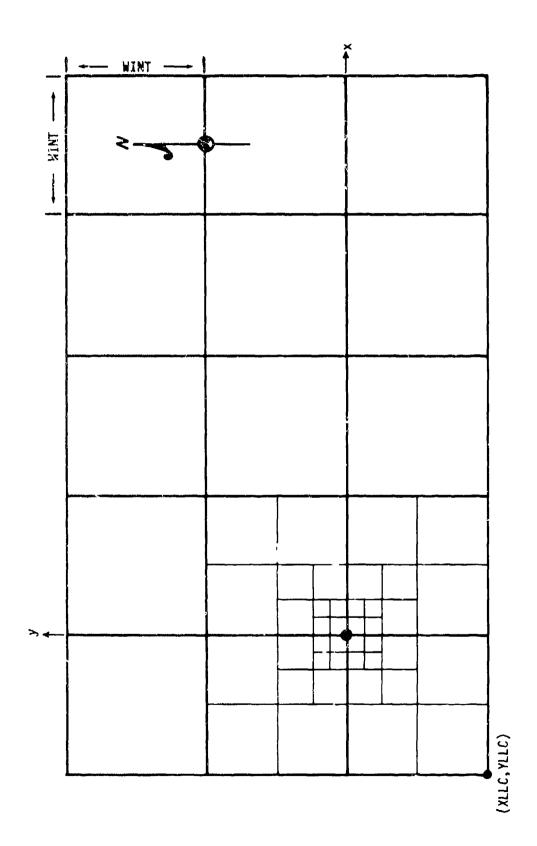


Illustration of a horizontal transport space net with ICX = 5, JCX = 3 and three levels of mesh quartering. Figure A.1.

four successive entries, each of which contains a positive or negative integer. A positive integer indicates that the mesh quarter is not further quartered and the integer serves as an index to the data arrays. A negative integer indicates that the quarter is itself quartered, and when set positive the integer serves as an index to the first of another set of four entries in NETSU, and so on.

Mesh quartering specifications are via DTM cards 5r which are read into array MARY(MARX). Having already received ICX and JCX for the control net, the code reads MARY(1) to MARY(MARX) where MARX = ICX*JCX. Each entry is for a different control net mesh, and if 0 it specifies quartering, but if 1 it specifies no quartering. As many cards are read as necessary to accommodate the MARX entries. Next, the code reads MARY(1) to MARY(MARK) where MARK = 4* (number of zeros found on the preceding MARY cards). These define the first subdivision level of mesh quarters, and as many cards are read as necessary to accommodate the MARK entries. This process is repeated for as many additional levels of subdivision as necessary.

Ordering of entries on the MARY cards is as follows. For the control net the first MARY entry is for the southwest corner mesh, we then proceed eastward along the bottom row to the right boundary, then to the left-most mesh in the row above, etc. The MARY cards for the quartered meshes are filled by considering the quartered meshes in the same sequence as their zeros are found on the preceding MARY cards which define them. Then for each set of quarters the entries are in the sequence

2	3
1	4

Figure A.2 gives the MARY cards required by the Fig. A.1 example. The control mesh entries are contained on card a, the first level of quartering on card b, the second on card c and the third on card d.

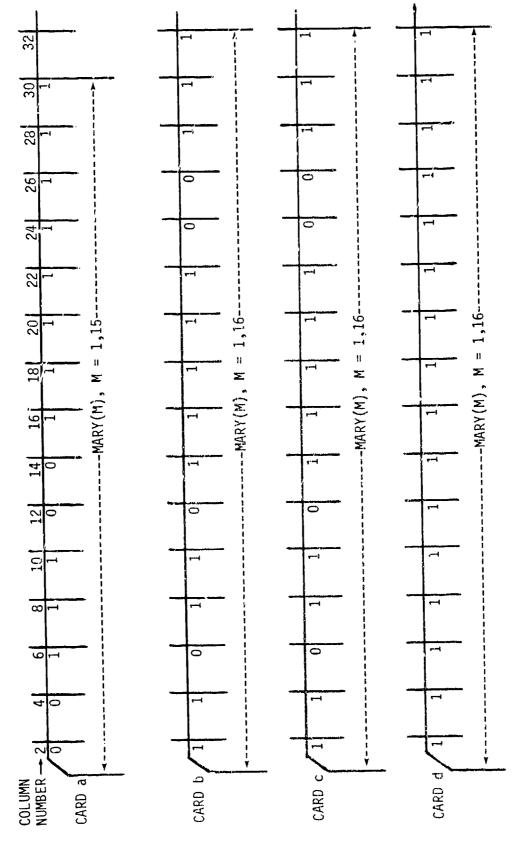


Figure A.2. MAR? cards required to define the net structure of Fig. A.1.

APPENDIX B

MAP ORDINATE THRESHOLDS

Two map ordinate threshold values are either specified by the user (QCUT and CUTMAP, sec. 2.4 and sec. 3.3, card 6) or set by the program. Here we describe how the program sets these values. The parameter QCUT, designated ω_{\min} in Vol. I sec. 5.2, is the minimum acceptable contribution from an individual deposit increment of fallout at any point in the map; that is, any contribution at any point less than QCUT is ignored. CUTMAP is the minimum acceptable cumulative value of contributions at any map point; that is, after accumulation of all contributions, any map ordinate with value less than CUTMAP is set to zero.

On the basis of experience we find that for H + 1 hour normalized exposure rate maps QCUT = 10^{-4} and CUTMAP = 10^{-2} work satisfactorily in most cases. These quantities are designated QCUTA and CUTMPA in the program (line 30 in subroutine OPM2). The QCUTA value assumes that the number of deposit increments of fallout is approximately in the range 500 to 2500, and it forms the basis of all QCUT evaluations; thus, if many fewer than 500 or many more than 2500 deposit increments of fallout are used, some experimentation with QCUTA values should be undertaken.

For exposure rates at times other than H + 1 hour and for integrated exposure (i.e., dose) QCUT = QCUTA* Φ where Φ is as for eq. (4.3.1) of Vol. I, and similarly for CUTMAP.

For activity from an individual mass chain (NREQ = 14. Table 3), QCUT = QCUTA* 2.08×10^{13} in units of equivalent fissions, and QCUT = QCUTA* 10^{-4} in units Curies m⁻², and similarly for CUTMAF.

For maps which use deposited fallout mass instead of activity (NREQ < 2 and NREQ > 10, Table 3) QCUT = QCUTA* $\rm m_s/(7~x~10^9 GW_F)$ where $\rm m_s$

is total mass of debris and soil lofted by the cloud, G is a combined grounded roughness-survey instrument response correction factor (GRUFF), and 7 x 10^9 is a rough average activity K factor ((Roentgen -m²)/(hr - KT)). CUTMAP is computed similarly.

APPENDIX C FISSION YIELD DATA CARDS (See sec. 3.4)

P239FI						
6.	0	•			ABEGN	1
0.	0.	0.	C •	Q •	ABEGN	2
0.	0.	0.	<u>ن</u> .	Ç.	ABEGN	3
0.	0 •	9.	0.	C.	ABEGN	4
ι .	0.	0.	Ç.	Ç•	ABEGN	5
0.	0 •	(3)) 0 0 5 3 3	U •	0.	ABEGN	6
•141000E+00		-600100E-13	-466000E-C1	• 16 J J 0 0E + 0 0	ABEGN	7
•105003E+00	.310000E-01 .594000E+00	0.	0.	0.	ABEGN	8
•253333E-02	3.	.828370E+30	-149800E+60	.749000E-01		9
•1650JJE+01	.104800E+01	0. 7870	-3040C0E-C1	.68 JJ00E+60	ABEGN	10
G.	.547000E+03	.7820u0E-J1 .258000E+01	.391000E-01	0.	ABEGN	11
0.	0.	0.	•258000E+01	•647J0 0E+0U	ABEGN	12
.29700JE+01	•50600 CE+01	•223000E+d1	0. •1330u0E+60	.397000E+00	ABEGN	13
.709000E-01	•279000E+01	.778600E+J1	•559000E+61	6. 	ABEGN	14
.25000JE+0D	0.	0.	•167000E+01	.5000 JOE+03		15
.113000E+02	.377D08E+01	•71900UE-01	Ü.	.871000E+01		16
•317000E+00	.708000E+01	•172000E+02	•405660E+01	.345365E+81	ABEGN	17 18
•533333E+00	3.	0.	0.	.454000E+01	ABEGN	19
.1960JUE+02	.212000E+02	.5620JJE+J1	0.	0.	ABEGN	20
.170000E+01	-164700E+C2	.326600E+02	•1647u8E+62	.8629JJE+00		21
.9629J0E+0B	3.	.246060E+01	.1294U6E+02	.387200E+02	•	22
•299200E+02	.572000E+ (1	ů•	(.	C.	ABEGN	23
0 •	.513000E+01	.383000E+02	.39106JE+62	.1435JUE+U2		24
.860000E+00	Ű •	0.	.8400U0E+00	.249000E+02	ABEGN	25
.6470JUE+U2	-217000E+02	.356JuuE+01	U •	0.	ABEGN	26
•1530J0E+02	•659C00E+C2	.355033E+02	.948000E+C1	0.	ABEGN	27
C •	0 •	0.	.6840CGE+U1	.563JuüE+02		28
•1040J0E+03	•492000E+C2	.391303E+J1	u •	0.	ABEGN	29
+655030E+10	.344000E+C2	.10370 JE+J3	•879143E+C2	.152310E+02	ABEGN	30
0.	0 •	0 •	.	.186J06E+02	ABEGN	3 1
.971000E+32	•126000E+03	.41930 BE+02	.7990L0E+(0	Ü•	ABEGN	32
0.	.404000E+01	•67879JE+J2	•153500E+03	.903000E+02	ABEGN	33
.120000E+02	0.	Ú•	£ •	C •	ABEGN	34
•374000E+02	•150090E+03	•150000E+03	.3740002+62	ű •	ABEGN	35
(• 36 / 00 0 m + n 4	•185000E+02	•1240C0E+03	•197000E+u3	.615000E+u2		36
.364000E+11 .196010E+01	7640005+00	0.	(•	0.	ABEGN	37
1260105401	.764000E+02	•215000E+03	•154000E+C3	.2720JUE+02		38
.2250705+03	•697000E+02	5054005436	.383000E+C2	.18 6000E+03	ABEGN	39
0.	.337000E+C1	•505100E+00 •100003E+03	•252550E+00	J.	ABEGN	40
•145171E+02	.145171E+02	0. • Inagarate 432	.2600C0E+03	•174J00E+03		41
1950305+33	.272000E+03	•966JUUE+J2	21.70:004.64	.344830E+62		42
0.	0.	.190360E+01	•247030E+C1 •998044E+62	0.	ABEGN	43
.231013E+13	.441000E+C2	9-	* 13000005405	•299000£+03		44
.24500JE+J2	-182900E+03	.311600E+03	.137400E+03	-817000E+01	ABEGN	45
G.	.987000E+60	.2710J0E+31	•105000E+u3	• 29 60 J U E+ 03		46 47
.213000E+03	-190346E+02	.190346E+U2	0.	0.	ABEGN	48
·627000E+02	-250000E+C3	.250000E+J3	.627000E+C2	ů•	ABEGN	49
e •	J •	0.	.142000E+02	.1380JuE+03		50
.273000E+03	.138000E+03	.142300E+32	0.	0.	AREGN	51
C •	3 •	.636300E+01	.107000E+03	.24200 JE+03		52
•142000E+03	•191000E+02	で•	l.	9•	ABEGN	53
C •	.272000E+01	.8 J776 JE+32	.2100U0E+03	•141000E+03		54
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7775005414	-246000E+01	.413300E+J2	•938000E+02	•5510 JUE+02		59
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.414560E+01
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   ·213006E+81
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                                                  .23 GO U E + C2
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   .402870E+02
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                   .158000E+01
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                                  .267000E+J2
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   . 672010E+02
                   .335000E+02
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   .766000E+01
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   .11 600 0E+03
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                                  .874J0 JE+J2
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   . 256000E+02
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.219000 E+63
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                 .579000E+01
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                                .876000E+J0
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                                                .124009E+02
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                                 .261232E+U2
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 .279030E+02
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                                                  .376248E+02
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.223300E+02
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 .398260E+02
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                                                               .6000J0E+L0 ABEGN 772
 .600000E+00
                .751000E-01
                                -3755JOE-01
                                                                            ABEGN 773
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                                                               .418030E+00 ABEGN 774
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                                                .9500CDE-(2
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                                                                            ABEGN 775
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                                . 258 JOUE-U1
                                                                            ABEGN 777
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                .106000E+00
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                                                .7170UJE+UB
                                                               .2390 UUE+ JD ABEGN 778
₽.
                                                               .842JJ0E+08 ABEGN 779
 .460000E-J2
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                                               .1660 JOE-C1
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                                                               .126000E+01 ABEGN 781
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                 •700000E--03
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                                                .8120G6E+C6
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                 .1198 a 0E+co
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 .780000E+02
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                 .3410G0E+02
                                .122008E+82
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                 .326000E+CO
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 . 27 60 00E+01
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 · 41300JE+02
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                .1790UDE+03
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                .212000E+02
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                                               .135095E+03
                                                               .675473E+02 ABEGN 939
 .393333E+02
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                                                                            ABEGN 940
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                                                                                  944
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                .1890U0E+G1
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,909000E+02
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                                                                  .4850 JUE+ UU ABEGN1130
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                                   .22900UE+02
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                  .140000E+03
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                                 .30700UE+02
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                 -841000E+02
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                                                                 .32700UE+01 ABEGN13J5
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                                                                              ABEGN1311
                 .810000E+00
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                                                                .2606 JUE+01 ABEGN1319
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.268000E+01 ABEGN1321
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                                                               .346000E+01 ABEGN1322
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.232000E+01
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                 .361100E+00
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                                                .571000 E-01
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  .463000E+02
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                                                                 .634330E+02 ABEGN1357
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                  .168000E+03
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  .916667E+00
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.107000E+82 ABEGN1381
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    .380000E-01
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                    .1670UDE+03
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                .3360u0E+C2
                                -170000E+02
                                                                            ABEGN1470
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                                                               .5620J0E+01 ABEGN1471
                                .291000E+02
                                                .257000E+ L2
                .8 47 000E+01
 .9030JDE-J1
                                .390000E+U1
                                                .221000E+02
                                                               .301000E+02 ABEGN1472
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                                                                            ABEGN1473
 .11C030E+$2
                .14050 0E+00
                                .742500E-41
                                                .129000E+02
                                                               .313000E+U2 ABEGN1474
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                                .578000E+00
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                                                                            ABEGN1475
 .138000E+02
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                                                               .377250E+U1 ABEGN1476
                .608000E+01
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                                                                            ABEGN1477
                                                               .1260 JUE+01 ABEGN1478
                .182000E+02
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 .229019E+31
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                                ·10000011+32
                                                                            ABEGN1480
 .27441UE+01
                .274410E+11
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                                                               .677000E+00 ABEGN1481
                                .366000E+82
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                                                .738000E+00
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                                                               .93313GE+UO ABEGN1433
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                                                               .39 70 0 CE+ 02 ABEGN1484
                                .850000E+J1
                                                .36800uE+C2
 .1760JJE+J2
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                                                .181963E+62
 .3390J0E+01
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                                .514 Ju JE+ J2
                                                .24706JE+60
                                                               .173J00E+02 ABEGN1437
 .97 000 DE+JJ
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                                .5523u JE+u?
                 .975000E+C1
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                 .175850E+00
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                                                .2362bUE+[2
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 .628000E+02
                 .107000E+(3
                                .236280E+J2
                                                               .1360JUE+03 ABEGN1492
                                                .68000JE+C2
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                                                                            ABEGN1493
                 .453500E+[1
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 • 743000E+02
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 .11 50 J OF +0 3
                 .189000E+C2
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                                                               .98 J740 E+ L1 ABECN1496
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                                .179JUJE+73
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 .56601 JE+11
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